Winston H. Hickox
Secretary for Environmental Protection

Gray Davis
Governor

FIELD EVALUATION OF UNDERGROUND STORAGE TANK SYSTEM LEAK DETECTION SENSORS

- Appendices -

August 2002

State Water Resources Control Board
Underground Storage Tank Program
P.O. Box 944212
Sacramento, CA 94244
www.swrcb.ca.gov/cwphome/ust/

TABLE OF CONTENTS

APPENDIX I
Summary of Phase I Testing (Veeder-Root Discriminating Sensors)

Phase I Testing Summary
(Field Evaluation of Veeder-Root Discriminating Sensors)

Introduction

Sensors are used in a variety of places within a UST system to detect a release of product. For double-wall systems, they are either located inside the secondary containment (sumps and under dispenser pans) or in the space between the primary and secondary containment of the tank or piping, known as the interstitial space. Field experience has shown that due to numerous design, installation, and maintenance issues these areas are often not kept clean of water intrusion or excessive condensation. This has led the industry to introduce sensors that are capable of differentiating between water and hydrocarbons. These sensors are referred to as "discriminating sensors."

Discriminating sensors can provide distinct alarms for water or product. Some even offer distinct alarms for low and high levels of water. Depending on how the control panel is programmed, a product or water (low or high level) detection can activate a warning, alarm, or pump shutdown. Typically, sensors are programmed to provide a warning when water is detected, which still allows the UST system to operate. Product detection is typically programmed to activate a fuel alarm, and may also automatically shut down the pump.

There are two basic approaches to discriminating sensors, as described in the following paragraphs. One approach to discriminating sensors is to combine two or more sensing elements into a single unit (See Figure I). This approach is well suited for sumps where surface water is prone to leak in, presenting the possibility of product floating on water. Sensing elements (most often a float switch) are used to detect low and high liquid levels. If the level rises above a preset point, the sensor notifies the operator by activating an alarm or warning message on a control panel. A hydrocarbon-sensing element (such as a product permeability sensor) is also incorporated to detect the presence of product. The combination of these multiple sensing elements into a single unit makes a discriminating sensor able to determine the presence of water versus hydrocarbons. There are several combinations of detection mechanisms that may be incorporated in a single unit to produce a discriminating sensor.

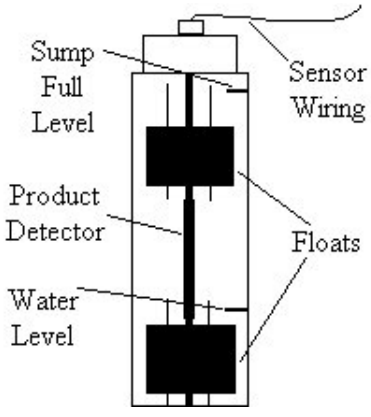


Figure I - A typical multi-element discriminating sensor with float switches and a product solubility element.

The second type of discriminating sensor uses only one detection mechanism, but is able to discern between product and other liquids based on some specific property of the liquid. Some adsistor, capacitance change, electrical conductivity, fiber optic chemical, and thermal conductivity sensors are sophisticated enough to distinguish between product and water.

Purpose of the Project

This report is based on testing performed only on discriminating sensors manufactured by Veeder-Root, as they are the most prevalent in California. We initiated a field study of discriminating sensors in response to local agency concerns that some of these sensors did not appear to operate properly when annual maintenance certification and inspections were conducted. Particular items of concern brought to our attention by local agency inspectors were:

- The inability of discriminating sensors to detect a layer of hydrocarbon-based product (i.e. gasoline) floating on top of water and to properly distinguish between water and product;
- The inability of polymer-based hydrocarbon detecting elements to alarm in a reasonable amount of time; and
- The inability of polymer-based hydrocarbon detecting elements to return to effective operation (recover) after exposure to hydrocarbons.

While this project was initially designed to address the aforementioned local agency concerns, we enlisted the help of discriminating sensor manufacturers and local agency inspectors to expand the scope of the study. The scope of the study included:

- Evaluating the functionality of discriminating sensors used in California (in response to the above listed concerns of local agency inspectors);
- Checking the adequacy of field-testing procedures for discriminating sensors (or work with manufacturers to develop field-testing procedures if they are not already available);
- Determining if discriminating sensors in the field perform consistently with the specifications outlined in their third-party evaluations; and
- Determining if the third-party evaluation protocol currently used is suitable for the sensor types tested using that protocol.

Coordination of the Field Testing

Since the focus of the testing was on the performance of sensors in the field, it was necessary to conduct testing at operating facilities where the sensors are installed. Three local agencies representing a cross section of California's UST population local regulatory governments volunteered to assist with this project. The City of Santa Ana, City of Santa Monica, and City of Oakland helped us to identify facilities within their jurisdictions that were using Veeder-Root discriminating sensors. In order to minimize the impact on owners, operators, and local agencies, we scheduled our field testing to coincide with the required annual inspections. The maintenance contractor performed the testing for the sensors while completing all the other scheduled annual certification work. Manufacturer's representatives were on hand to observe the testing, assist with the advanced setup and diagnostic features of the sensor control panel, and to answer technical questions.

Testing Procedure

In order to test the sensors during this evaluation, Veeder-Root prepared a draft testing procedure. We reviewed and provided comments on the draft test procedures, which were then

modified by Veeder-Root and re-submitted as a second draft. The second draft was the testing procedure used in our field evaluation. Modifications were made throughout the study, as deemed necessary by our staff on site. Modifications were included to minimize station downtime, and to test possible improvements to the protocol (such as the cleansing of sensors in white gas[1] to accelerate recovery of polymer strips.)

The basic test procedure was to immerse the discriminating sensor in fuel, water, or a fuel/water mixture to see if it alarmed appropriately (e.g., water and/or fuel). We modified the procedure by using a stopwatch to determine the length of time between sensor immersion and alarm, and the length of time for the sensor to recover after being removed from the liquid. We also noted the type and the depth of the liquid in which a sensor was immersed, as well as the type of alarm (fuel, water, or both water and fuel) the sensor registered.

Test procedures varied slightly between sensor models, due to differences in detection mechanisms. Veeder-Root's discriminating sensors can be classified in two general families based upon their fuel-sensing mechanisms: Ultrasonic sensors (model 794380-341), and Polymer Strip Sensors (all other models tested). Table I lists the Veeder-Root discriminating sensors tested in this study, including the mechanisms each sensor model uses to determine the presence of liquid and/or fuel, and the testing procedure used in our study.

TABLE I - Veeder-Root's Discriminating Sensors

Model Number	Application	VR Test Procedure	Water Sensing Mechanism	Fuel Sensing Mechanism
794380-320	Dispenser Pan	A	Ultrasonic	Polymer Strip
794380-350	Sump (Pump or Piping)	A	Ultrasonic	Polymer Strip
794380-322	Dispenser Pan	A	Float Switch	Polymer Strip
794380-352	Sump (Pump or Piping)	A	Float Switch	Polymer Strip
794380-360	Fiber Trench	A	Ultrasonic	Polymer Strip
794380-361	Fiber Trench	A	Ultrasonic	Polymer Strip
794380-362	Fiber Trench	A	Ultrasonic	Polymer Strip
794380-341	Interstitial	B	Ultrasonic	Capacitance Change

Data Collection

City of Santa Ana

SWRCB staff, local agency inspectors, maintenance contractors, and Veeder-Root representatives collected data for this project. Data collection began in Santa Ana in August 2000, where the local agency inspector, maintenance contractor, Veeder-Root representatives were present at each testing site. SWRCB staff was present at some of the Santa Ana sites. Veeder-Root representatives recorded the test data in Santa Ana. This data was forwarded to us for analysis. (See Table II for a summary of this data.)

[1] Since the time of testing we have heard from other manufacturers of polymer strip sensors that this practice, although common among service technicians, may have an adverse effect on the polymer strip sensor's continued functionality. SWRCB staff does not recommend cleansing sensors with white gas unless specifically instructed to do so by the sensor manufacturer.

SWRCB staff did not always witness testing in Santa Ana. Additionally, we were still refining the scope of data to be collected, testing procedures, and protocol for data collection. For these reasons, results of testing in Santa Ana were usually considered only when making general observations and conclusions in this report, not in making any specific calculations. An exception to this is test data for model 794380-341 sensors. Santa Ana test data for this model has been included in the calculations of this report, since the sample size in Santa Monica and Oakland was so small. The local agency inspector present at all Santa Ana sites furnished us with his reports on the sites equipped with model 794380-341 sensors, and this data was used in calculating pass/fail rates for that model.

City of Oakland and City of Santa Monica

Testing was conducted in Oakland and Santa Monica in October and November 2000. Local agency inspectors, Veeder-Root personnel, service technicians, and SWRCB staff were present at all facilities tested. SWRCB staff recorded all test data. Upon completion of testing, the data collected from Oakland and Santa Monica was compiled in a data table, which is summarized in Table III.

Table II - Summary of Veeder-Root Test Data from Santa Ana*

Dates of Testing	August 21st–25th, 2000
Number of Facilities Tested	8
Number of Sensors Tested	(model 794380-208) = 18 (model 794380-320) = 3 (model 794380-341) = 13 (model 794380-350) = 26 (model 794380-352) = 5 (model 794380-362) = 1 (model 794380-40x) = 10
Total Number of Sensors Tested	**76**

*Detailed test information not available for Santa Ana facilities

Table III - Summary of Test Data from Oakland and Santa Monica

Number of Facilities Tested	18
Number of Sensors Tested	(model 794380-320) = 2 (model 794380-322) = 1 (model 794380-341) = 6 (model 794380-350) = 8 (model 794380-352) = 49 (model 794380-360) = 1
Total Number of Sensors Tested	**67**
Pass/Fail Data for Model 794380-341	4 passes, 2 failures
Range of Response Times in Fuel and Fuel/Water Mix (794380-350)	3:26 to 42:50 (min:sec)
Range of Recovery Times in Fuel and Fuel/Water Mix (794380-350)	19:49 to 70:40 (min:sec)
Range of Response Times in Water (794380-352)	2 to 18 seconds
Average Response Time in Water (794380-352)	8 seconds
Range of Response Times in Fuel and Fuel/Water Mix (794380-352)	4:59 to 12:10 (min:sec)
Average Response Time in Fuel and Fuel/Water Mix (794380-352)	7 minutes, 15 seconds
Range of Recovery Times in Fuel and Fuel/Water Mix (794380-352)	0:27 to 52:29 (min:sec)
Average Recovery Time in Fuel and Fuel/Water Mix (794380-352)	17 minutes, 26 seconds

Discussion

Since the operating mechanism and testing procedure of the Veeder-Root model 794380-341 sensor are different than all the other sensors in our study, it is reasonable to divide the "discussion" section into two parts: one part for the 794380-341 (ultrasonic mechanism), and one for all of the other sensors in our study (polymer-strip mechanism).

Ultrasonic Mechanism (Veeder-Root Model 794380-341)

Our testing showed the 794380-341 interstitial fiberglass tank sensor performed unsatisfactorily. Eleven of 20 model 794380-341 sensors failed when tested in the field[2]. Usually, the sensors detected the presence of liquid, but were unable to discriminate between fuel and water. Veeder-Root determined the failures are due to a faulty solder joint within the sensor, and is planning to make design changes to eliminate the problem. Since the sensor cannot reliably discriminate between fuel and water, Veeder-Root intends to reclassify the current 794380-341 sensor as non-discriminating[3].

When testing the 794380-341 sensors in Santa Ana, we observed that they often came out of the tanks wet. The moisture was a clear, odorless and somewhat gooey film. When the film dried, it became milky white[4]. There appeared to be moisture in the interstitial spaces of the tanks these sensors are monitoring, but not enough to activate an alarm. Follow-up information from Santa Ana indicates that these sensors had to be cleaned before they would alarm properly when tested, and that this is a common occurrence observed by inspectors during routine sensor field certifications.

Polymer-Strip Mechanism (Veeder-Root Models 794380-320, 794380-322, 794380-350, 794380-352, 794380-360, 794380-361, and 794380-362)

The polymer-strip discriminating sensors consist of three separate sensing elements. The low and high liquid detectors are float switches or ultrasonic sensors depending on the model. The product-sensing element is a polymer strip that absorbs hydrocarbons. The strip is imbedded with small particles of conductive material (See Figure II). As the strip absorbs hydrocarbons, the material expands and the strip becomes less conductive (e.g. the resistance rises). When the resistance reaches a certain level (for Veeder-Root sensors this is set at approximately 250 kΩ to 500 kΩ) an alarm is activated.

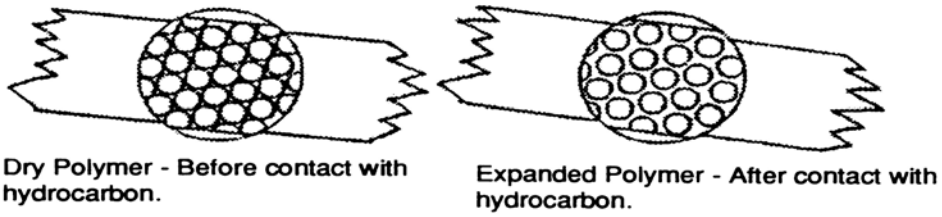


Figure II – Polymer strip used in discriminating sensors

[2] Includes data supplied by the local agency inspector present at Santa Ana test sites.
[3] Veeder-Root has completed reclassification of the model 794380-341 sensor since this summary was originally prepared.
[4] The local agency inspector present at these facilities was concerned that the liquid may include resin or adhesive used in construction of the fiberglass tanks where these sensors are installed.

The low and high-level liquid sensors proved to be generally effective. They typically activated a liquid alarm in less than the third-party specified time. On the few occasions that a sensor did not respond properly, the problem was usually diagnosed as faulty wiring or improper programming of the console and not a design problem.

While our field-testing showed the low and high level liquid sensors to be effective, several issues concerning the polymer strip were raised which may be cause for concern and further investigation. Other issues, such as control panel configuration and testing protocols, were also brought to light in the course of field-testing. The following paragraphs discuss these concerns in detail.

1. Response and recovery times of the polymer strip element when exposed to fuel were sometimes excessive, and not always consistent with third-party claims. Primary concerns include the length and variation of response and recovery times, as discussed below:

   (a) Length of Response Times

   The fuel alarm is activated only after enough fuel has permeated the polymer strip to raise its electrical resistance to a value of 250 kΣ-500 kΣ. The time required to reach the necessary electrical resistance varied from 5 to 12 minutes, with an average of just above 7 minutes. Typically the resistance in the strip did not change appreciably for several minutes. In the event of a catastrophic leak, this response time could lead to large amounts of fuel in the dispenser pan or containment sump. As the liquid level reaches the high-level liquid sensor a high level water alarm will sound, but it could still be many minutes before the polymer strip reacts to the fuel and activates a fuel alarm. This would be a major concern if the system is not configured for turbine shutdown when the high level water alarm is activated.

   (b) Variation of Response Times

   With the wide variation in response times between sensors of the same model tested in the same product, it is difficult to say exactly how long a polymer-strip sensor should typically take to alarm once exposed to fuel. This makes it difficult to establish field-testing guidelines, or to determine if a sensor is actually non-functional or just slow to respond.

   (c) Length of Recovery Times

   Recovery times often exceeded the third-party value of 17.17 minutes. Values ranged from under 1 minute to over 52 minutes, with an average of more than 17 minutes. Like a sponge in water, the strip swells when exposed to fuel. It must completely dry out and return to its original shape in order to come out of alarm. This can take quite awhile, depending on how saturated the strip is and how volatile the liquid is. In the interest of time, our test procedure called for a minimum amount of fuel, and for the sensor to be removed from fuel as soon as it alarmed. We even experimented with removing the sensor from fuel before it had alarmed in hopes of decreasing recovery times. Even so, the recovery times were high. Although the test protocol used in this study did not include long-term immersion of sensors in fuel, it is reasonable to believe that sensors immersed in fuel for extended periods of time (as would be the case in the event of an actual leak) would take even longer to recover, or may not recover at all.

2. Response and recovery times seem to vary with weather conditions.

   (a) Warm and dry vs. cool and wet conditions

   Although it is difficult to substantiate with hard data due to the inconsistency of our testing procedures[5], the polymer strips tended to respond and recover more quickly in warmer weather. We observed that sensors tested in the sun and sensors tested during dry conditions recovered more quickly than sensors tested in rainy or colder weather. This may be due to the fact that in colder or more humid weather fuel is less volatile.

   (b) Very cold conditions

   The correlation between temperature and response/recovery time may become a major factor at extremely low temperatures. In our field evaluation, we did not test sensors in freezing conditions, so we do not know if the polymer strips are still effective at these temperatures. Is fuel volatile enough during freezing temperatures for the sensor to absorb the hydrocarbons and go into alarm? We posed this question to Veeder-Root in a letter. Nowhere in the third-party evaluation is temperature or humidity considered. We simply do not know how effective these sensors will be in extreme temperatures.

   In addition to the polymer strips, we are also concerned about the functionality of float switches in freezing conditions, especially those monitoring shallow sumps and shallow under-dispenser containment boxes. It may be possible for condensation to freeze on a float switch and render it inoperable.

3. The frequency of data transmittal between the sensor and the control console is a factor in response and recovery times.

   The console (e.g., TLS 350) "looks" at the status of each sensor or leak detection element in the UST system. It cycles through each sensor and element in the system before returning to the beginning. If multiple sensors and elements are built into the programming, it may take more time for the console to return to a particular sensor. As a result, facilities with a large number of sensors may take longer to activate an alarm at the console than those with a small number of sensors.

4. Alarm Settings and Pump Shutdown Features.

   Many of Veeder-Root's polymer-strip discriminating sensors have three different types of alarms: a low liquid alarm, a high liquid alarm, and a fuel alarm.

   - The low liquid alarm is triggered by a float switch or ultrasonic mechanism located at or near the bottom of the sensor housing. This mechanism will "trip" whenever it is covered with fluid. It does not discriminate between water and fuel. This mechanism activates a warning (yellow light) at the control panel.
   - The high liquid alarm is also triggered by a float switch or an ultrasonic mechanism, which is located a few inches from the top of the sensor housing.

[5] In warm weather, the thin layer of fuel used on top of water evaporated completely before the sensor alarmed. The service person conducting the test had to add more fuel several minutes into the testing, causing very long response times. Therefore the correlation between temperature and response time which might otherwise have been evident is not readily recognized.

Again, this mechanism cannot discriminate between water and fuel. This mechanism activates an alarm (red light) at the control panel.

- A fuel alarm is triggered by a polymer strip that runs the length of the sensor housing, from the bottom of the sensor to the top float switch. Unless the polymer strip detects hydrocarbons, alarms from this mechanism are considered an indication of water intrusion. This mechanism activates an alarm (red light) at the control panel.

Both warnings and alarms are designed to alert the operator that there is something wrong with the UST system. Each requires investigation, and should receive an appropriate response from the operator. Warnings and alarms may also be programmed to activate pump shut-down, which turns off the turbine so that the UST cannot operate. Pump shut-down is generally only done with alarms.

If warnings or alarms are ignored and the liquid level exceeds the height of the top float switch, the sensor no longer detects additional fuel or water entering the sump. The sensor becomes ineffective and no longer provides leak detection; therefore, pump shut down at the high level alarm is a must.

5. High Vapor Mode

Another feature of the Veeder-Root control panel is the "High Vapor Mode." This operating mode is designed for use in areas where background levels of hydrocarbon vapors are high enough to activate the fuel alarm, even though the UST system is not leaking. This may be due to a previous release of product, or possibly the materials and adhesives used in the construction of the UST itself may release vapors. "High Vapor Mode" is a tool used to eliminate false alarms. When the console is configured in "High Vapor Mode," the sensor will not sound a fuel alarm unless it detects both the presence of liquid and hydrocarbons. The low liquid alarm mechanism must be triggered and the resistance in the polymer strip must be high enough to trigger a fuel alarm.

Although the sensors we tested in "High Vapor Mode" seemed to be generally effective, they have not been third-party certified for operation in "High Vapor Mode" versus "Low Vapor Mode."

6. Lack of Field Testing Procedures.

Although each manufacturer may provide its own manual of procedures for testing discriminating sensors, there are several different tests a technician can run. Some agencies require a test of the low and high liquid alarms only. Some agencies require testing the sensors in fuel and water separately. And some agencies require each sensor to be tested in fuel, in water, and in a fuel/water mixture.

Based on the results of our field testing, we determined that it is necessary to periodically test all sensors in fuel. Even though the consoles are designed to run diagnostics on the sensors, the consoles do not always recognize problems with sensors or their wiring. We encountered two or three sensors that were either not programmed properly or had wiring problems. These programming or wiring problems were only discovered through

physical testing of the sensors in fuel. We might also benefit from testing sensors in a water/product mixture, since it simulates more accurately conditions encountered in parts of the UST system that are prone to water intrusion.

7. Degradation of Polymer Strips

   Our testing provided no conclusive information as to the long-term reliability of polymer-strip sensors in harsh environments, or after repeated/prolonged exposure to hydrocarbons. Results of testing showed a wide variation in the response and recovery times for the polymer strip sensors. In many cases these times exceeded the third-party specifications.

   The manufacturers of polymer strips claim the strips are testable and reusable, but each time the strip comes in contact with fuel, it apparently either retains some of the volatile compounds within its material or its elasticity is compromised after repeated/prolonged hydrocarbon exposure. Once exposed to fuel, the sensor is no longer "good as new." Eventually, the sensor will degrade so much that either it may not recover from an alarm condition (the resistance will not drop to the point that it comes out of alarm), or the probability of false alarms will be very high. We do not know how many testing cycles a sensor can reasonably accommodate.

8. Volatility of Stored Product

   The polymer strip is most readily activated by volatile hydrocarbons, with unleaded fuel and white gas producing the most rapid responses. The sensors also recovered from exposure to these fuels fairly consistently. Diesel fuel would activate an alarm, but not nearly as quickly as the more volatile unleaded fuel. Recovery times were very slow. Veeder-Root suggested cleaning sensors exposed to diesel fuel with white gas in order to speed up recovery. Technicians told us that sensors exposed to diesel must often be air-dried for days, and even then, sometimes never recover.

   Although we encountered some waste oil UST systems being monitored by Veeder-Root discriminating sensors, we did not test the sensors in waste oil. Veeder-Root's sensors are not third-party evaluated for use in waste oil applications. We are concerned that waste oil may not be volatile enough to trigger an alarm from polymer strip sensors.

9. Third-Party Protocol is Inappropriate for Polymer Strip Sensors

   Third-party testers have been using standard liquid point detection protocols to evaluate the polymer-strip sensors. These protocols are usually designed for mechanical or electrical switching devices that do not use chemical reactions like the polymer strips. It may be necessary to develop a protocol that takes into account the unique aspects of polymer-strip sensors. Ability to alarm and recover in a variety of environmental conditions should be assessed. The impact of repeated exposure of these sensors to fuel on response time and recovery time should also be evaluated.

APPENDIX II
Workplan for Phase II of the Field Evaluation

SWRCB Sensor Field Evaluation Workplan (Phase II) – July 3, 2001

Team Members

Project Supervisor: Shahla Farahnak, P.E.
Project Coordinator: Scott Bacon
Assistant Coordinator: Raed Mahdi
Field Testing Staff: Raul Barba, Eric Luong, and Jennifer Redmond

Purpose of the Project

This project is intended to evaluate the functionality of liquid and vapor sensors used to monitor UST systems. The focus will be on "real world" effectiveness, with testing performed at operating facilities where the sensors are currently installed. The study is designed to:

- Evaluate the functionality of sensors used in California;
- Check the adequacy of field-testing procedures for sensors (or work with manufacturers to develop field-testing procedures if they are not already available);
- Determine if sensors in the field perform consistently with the specifications outlined in their third-party evaluations; and
- Determine if the third-party evaluation protocol currently used is suitable for each of the sensor types evaluated with that protocol.

Coordinating Field Efforts

In order for us to test at a UST facility, several people must be present or notified. At a minimum, this will include SWRCB staff and a service technician on site, as well as notification of the facility owner/operator. Additionally, local agency inspectors and sensor manufacturers may be present. We plan to work with local agencies and maintenance contractors to coincide our testing with the required annual maintenance inspections already scheduled at the facilities

Data Collection Process

- ***Field Testing Method*** – Experienced service technicians will conduct the testing. They will access sensors in sumps, tank interstice, dispenser pans, excavation linings, and monitoring wells. The sensors will be immersed in water at a depth corresponding to their third-party evaluation. In addition, discriminating sensors will be tested in fuel and/or a fuel/water mixture.
- ***Data Recording*** – Our staff will observe the testing and record data. We will record sensor response and recovery time, as well as information about the sensor make, model, and application. Additionally, we will record data about the facility and the condition of the area the sensor is located in. Through careful collection and analysis of data, we hope to determine what factors may adversely effect sensor performance.
- ***Industry Professional's Survey*** - In addition to the data collected from field-testing, we will survey experienced maintenance technicians and inspectors. Their responses will be used to supplement our field data and give us a clearer picture of sensor effectiveness.

Safety Considerations

Qualified contractors will perform all hands-on testing. They have been trained to safely deal with the equipment and hazardous substances found at the facilities where our testing will take place. Our staff will only observe and record data, but all applicable standards of safety will be adhered to. This includes, but is not limited to, proper securing of the work area from traffic hazards.

Final Report/Summary

A thorough report will be completed at the end of field-testing. It will detail our testing activities and present the data collected from both the tests and completed surveys. In addition, the report will state conclusions and recommendations based on the results of our study.

APPENDIX III
Location of Facilities Included in the Field Evaluation

Location of Facilities Included in the Field Evaluation of Underground Storage Tank System Leak Detection Sensors

APPENDIX IV
Field Data Collection Forms

SWRCB SENSOR FIELD EVALUATION
SITE DATA COLLECTION FORM

Site # _____

SITE INFORMATION

Date:	**Time Testing Begins:**	**Time Testing Ends:**
Facility Name:	**Address:**	
Facility Ownership: Major Oil ☐ Independent Oil ☐ Government Agency ☐ Other:		
Tank Type: Single-Wall ☐ Double-Wall ☐ Steel ☐ Fiberglass ☐ Dry ☐ Hydrostatic ☐		
Piping Type: Single-Wall ☐ Double-Wall ☐ Pressurized ☐ Suction ☐ Steel ☐ Fiberglass ☐ Flex ☐ Fiber Trench ☐		
# of Tanks:	**# of Sumps:**	**# of Dispensers:**

STAFF

SWRCB Staff Present:	
Local Agency Staff Present	**Agency:**
Service Technician(s) Conducting Test:	
Contractor:	**Years in Industry:**
Manufacturer's Representatives:	**Manufacturer:**

WEATHER CONDITIONS

Temperature at Start of Testing:			**Temperature at End of Testing:**	
Humidity at Start of Testing:			**Humidity at End of Testing:**	
General Conditions:	Sunny ☐	Cloudy ☐	Windy ☐	Light Rain ☐
	Heavy Rain ☐	Fog ☐	Other:	

COMMENTS:

SWRCB SENSOR FIELD EVALUATION, SENSOR DATA COLLECTION FORM

EQUIPMEMNT INFORMATION

Sensor Make:	**Sensor Model:**
Sensor Serial #:	**Sensor Manufacture Date:**
Control Panel Make:	**Control Panel Model:**
Control Panel Serial #:	**Control Panel Manufacture Date:**
Operating Principle: Float Switch ☐ Ultrasonic ☐ Product Permeable ☐ Optical ☐ Capacitance Change ☐ Product Soluble ☐ Thermal Conductivity ☐ Conductivity ☐	
Discriminating? Y N **Continuous? Y N**	**Reusable? Y N** **Listed in LG-113? Y N**

APPLICATION INFORMATION

Sensor Location: Tank Interstice ☐ Pump Sump ☐ Fill Sump ☐ UDC ☐ Vapor Well ☐ Groundwater Well ☐ Trench Liner ☐			
Is Sensor at Lowest Point? **Yes No NA**	**Is Wiring Connected Properly?** **Yes No NA**	**Total # of Sensors Recorded on this Form:**	
Sensor Location… (check all that apply)	Is Clean and Dry ☐ Contains Water ☐ Contains Debris ☐ Brine-Filled ☐ Contains Product ☐ Contains Backfill ☐ Has Strong Vapor Smell ☐		
Sensor is Monitoring for the Presence of…	Regular Unleaded ☐ Mid-Grade Unleaded ☐ Premium Unleaded ☐ Water ☐ Diesel ☐ Brine ☐ Waste Oil ☐ Other:		
Tank/Sump/UDC Monitored by Sensor is…	Steel ☐ PVC/Plastic ☐ Fiberglass ☐ Membrane/Liner ☐ HDPE ☐ Other:		
Tank/Sump/UDC Manufacturer:			

WATER TEST (Low)

Water Height:					**Response Time**			
Recovery Time					**Pump Shut-Down**	Yes	No	NA
Alarm Activated:	Water	Product	Both	None	**Test Result:**	Pass		Fail

WATER TEST (High)

Water Height:					**Response Time**			
Recovery Time					**Pump Shut-Down**	Yes	No	NA
Alarm Activated:	Water	Product	Both	None	**Test Result:**	Pass		Fail

PRODUCT TEST **Product Used:**

Product Height:					**Response Time**			
Recovery Time:					**Pump Shut-Down**	Yes	No	NA
Alarm Activated:	Water	Product	Both	None	**Test Result:**	Pass		Fail

PRODUCT ON WATER TEST

Water Height:					**Product Thickness:**			
Response Time:					**Recovery Time:**			
Alarm Activated:	Water	Product	Both	None	**Pump Shut-Down**	Yes	No	NA
Product Used:					**Test Result:**	Pass		Fail

After testing this sensor was: Repaired[1] ☐ Replaced ☐ Re-Tested[2] ☐ Re-Installed ☐

COMMENTS:

[1] Describe repairs in Comments section

[2] If the sensor is re-tested, record test data in another sensor form and attach it to the back of this form

Veeder-Root Discriminating Sensor Field Performance Test

Site Address: _____ Date: _____

Testing Contractor: _____ SWRCB Staff: _____

Weather Conditions: _____ Diameter of test apparatus (in.): _____ Site ID #: _____

		High Water Level				Fuel					Water/Fuel Mixture						Pass Or Fail?
	Sensor Model	Water Level (in.)	Response		Recovery Time (mm:ss)	Fuel Level (in)	Time in Fuel (mm:ss)	Response		Recovery Time (mm:ss)	Water Level (in.)	Fuel Thickness (in.)	Time in Liquid (mm:ss)	Response		Recovery Time (mm:ss)	
			Time to Alarm (mm:ss)	Alarm Type (WFN)				Time to Alarm (mm:ss)	Alarm Type (WFN)					Time to Alarm (mm:ss)	Alarm Type (WFN)		
S1																	
S2																	
S3																	
S4																	
T1																	
T2																	
T3																	
T4																	

Comments:

1) Sensor Location: T1 to T4 are sensors in tanks 1-4, S1 to S4 are sensors in the turbine sumps of tanks 1-4, additional sensor locations should be included in the "comments" section of this form.
2) Alarm Type: W = Water, F = Fuel, N = None. Include both W and F if applicable.
3) Times: All times will be taken from the moment the sensor is placed in the fluid. The clock will not be zeroed between alarm activation and recovery.
4) Indicate any sensors that were replaced, noting the model # of the old and new sensors as well as the reason for replacement.

APPENDIX V

Sensor Survey Distribution Letter, Survey Form, Results, and Comments

State Water Resources Control Board

Division of Clean Water Programs
1001 I Street • Sacramento, California 95814 • (916) 341-5871
Mailing Address: P.O. Box 944212 • Sacramento, California • 94244-2120
FAX (916) 341-5808 • Internet Address: http://www.swrcb.ca.gov

Winston H. Hickox
Secretary for Environmental Protection

Gray Davis
Governor

October 24, 2001

TO: Interested Parties

SURVEY FORM FOR SENSOR FIELD STUDY

We are sending this letter to you, as someone who may have expertise in the performance of the various sensors used in UST systems. We are concerned about the performance of these sensors, specifically those in tank-top sumps, tank annular spaces, and under dispenser containment. As you know, their performance is critical in detecting leaks. Therefore, we have initiated our own study to evaluate their effectiveness under actual operating conditions.

We plan to visit 200 operating UST facilities and collect data on sensor performance. However, we recognize that our field study is limited and would be incomplete without input from those who have valuable first-hand experience with these sensors. Therefore, we are requesting your assistance to complete the enclosed survey form and return it to us. This will allow us to incorporate your knowledge and experience into our study. We estimate it will take approximately 30 minutes to complete the entire survey, however we are interested in your views even if you can only complete a portion.

Please distribute the survey to anyone in your organization who routinely works with UST leak detection sensors. This includes, but is not limited to, service technicians, inspectors, installers, and environmental managers. Please return the completed surveys by **November 15, 2001** to:

Attention: Scott Bacon
State Water Resources Control Board
Department of Clean Water Program
P.O. Box 944212
Sacramento, CA 94244-2120
Fax: (916) 341-5808

If you prefer, you may complete and submit the survey online at:
http://www.calcupa.net/support/index.htm

If you have any questions regarding this survey, please contact Scott Bacon at (916) 341-5873 or email: bacons@cwp.swrcb.ca.gov.

Sincerely,

- ORIGINAL SIGNED BY -

Shahla Dargahi Farahnak, P.E., Chief
Engineering Unit 2
Underground Storage Tank Program

Enclosure

UST SENSOR STUDY SURVEY

STATE WATER RESOURCES CONTROL BOARD

(Please answer all the questions that are applicable based on your experience in the field)

Information provided by: – (Leave blank if you prefer to submit this survey anonymously)

Name: _____ Company/Agency: _____
Address: _____ Telephone: _____

GENERAL INFORMATION

1. What is your affiliation? □ Local Agency Inspector □ Technician □ Consultant
□ Owner/Operator □ Other (*Specify)* _____

2. How many years of experience do you have in the UST field? _____

3. Average number of UST facilities you inspect/service monthly? _____ □ Not applicable

OVERALL SENSOR INFORMATION

4. Do you perform/require a functional test (i.e. accessing the sensors and activating an alarm by flipping them over, immersing them in liquid, etc.) of all sensors during the annual UST monitoring equipment certification? □ Yes □ No

5. What percentage of the sensors you encounter in the field are failing the functional tests?

□ <5% □ 5-10% □ 10-20% □ 20-30% □ 30-40% □ 40-50% □ >50%

6. What percentage of the sensor failures are due to the following factors:

a) Poor design:	□ <5%	□ 5-10%	□ 10-20%	□ 20-30%	□ 30-40%	□ 40-50%	□ >50%
b) Installation:	□ <5%	□ 5-10%	□ 10-20%	□ 20-30%	□ 30-40%	□ 40-50%	□ >50%
c) Maintenance:	□ <5%	□ 5-10%	□ 10-20%	□ 20-30%	□ 30-40%	□ 40-50%	□ >50%
d) Programming:	□ <5%	□ 5-10%	□ 10-20%	□ 20-30%	□ 30-40%	□ 40-50%	□ >50%
e) Tampering:	□ <5%	□ 5-10%	□ 10-20%	□ 20-30%	□ 30-40%	□ 40-50%	□ >50%
f) Other:	□ <5%	□ 5-10%	□ 10-20%	□ 20-30%	□ 30-40%	□ 40-50%	□ >50%

7. Sensor failure is most common in: □ Steel Tanks □ Dry Interstice Fiberglass Tank
□ Wet Interstice Fiberglass Tank □ Tank-Top (pump/fill) Sumps
□ Under Dispenser Containment □ Location is not a factor in sensor failure

SENSOR COMPARISON

8. Please complete this section to the best of your knowledge:

	Float switch	Polymer strip	Optical Prism	Ultrasonic	Conductivity	Capacitance change
% failure rate						
* Indicate most common reason(s) for failure						

*Failure Reasons: P = Programming M = Maintenance I = Installation T = Tampering
PD = Poor Design Other = Please indicate

9. What specific make(s) and/or model(s) of sensor are **most** reliable? _____
_____

10. What specific make(s) and/or model(s) of sensor are **least** reliable? _____
_____

DISCRIMINATING SENSORS

11. What percentage of the sensors you use/inspect/service are discriminating sensors?

- Tank Interstice: □ <5% □ 5-10% □ 10-20% □ 20-30% □ 30-40% □ 40-50% □ >50%
- Turbine Sumps: □ <5% □ 5-10% □ 10-20% □ 20-30% □ 30-40% □ 40-50% □ >50%
- Under Dispenser: □ <5% □ 5-10% □ 10-20% □ 20-30% □ 30-40% □ 40-50% □ >50%

12. Based on your experience, discriminating sensors are _____ when compared to non-discriminating sensors?

□ **More** reliable □ **Less** reliable □ **Equally** reliable

13. For discriminating sensors using polymer strip, what is the typical time for each of the following?

a) response in unleaded fuel:
□ <30sec □ 30-60sec □ 1-3min □ 3-5min □ 5-10min □ 10-20min □ >20min

b) recovery in unleaded fuel:
□ <1min □ 1-3min □ 3-5min □ 5-10min □ 10-20min □ >20min □ Not reusable

c) response in diesel fuel:
□ <30sec □ 30-60sec □ 1-3min □ 3-5min □ 5-10min □ 10-20min □ >20min

d) recovery in diesel fuel:
□ <1min □ 1-5min □ 5-15min □ 15-30min □ 30-60min □ >60min □ Not reusable

14. Is there a change in response times for polymer strip sensors after repeated exposure to fuel?

□ Response time for polymer-strip sensors **increases** after repeated exposure to hydrocarbons.
□ Response time for polymer-strip sensors **decreases** after repeated exposure to hydrocarbons.
□ Response time for polymer strip sensors **does not change** after repeated exposure to hydrocarbons.

15. Which of the following methods do you most often use/require when testing discriminating sensors?

□ Test in **water** only □ Test in **product** only □ Test in **both** product and water
□ Flip sensor over □ I do not test/require testing of discriminating sensors

PUMP SHUT-DOWN FEATURE

16. What is the typical time delay between sensor activation and pump shut-down?

□ <5sec □ 5-10sec □ 10-30sec □ 30-45sec □ 45-60sec □ 1-2min □ >2min

17. For sensors programmed for pump shut-down, what percent of them shut down the pump?

□ <5% □ 5-10% □ 10-20% □ 20-30% □ 30-40% □ 40-50% □ >50

18. What are the most common reason(s) for failure of the pump shut-down?

□ Programming □ Maintenance □ Installation □ Tampering
□ Relay box (Equipment problems) □ Other (Specify) _____

ADDITIONAL INFORMATION

19. What changes can be made to improve sensor reliability?_____

_____
_____
_____
_____

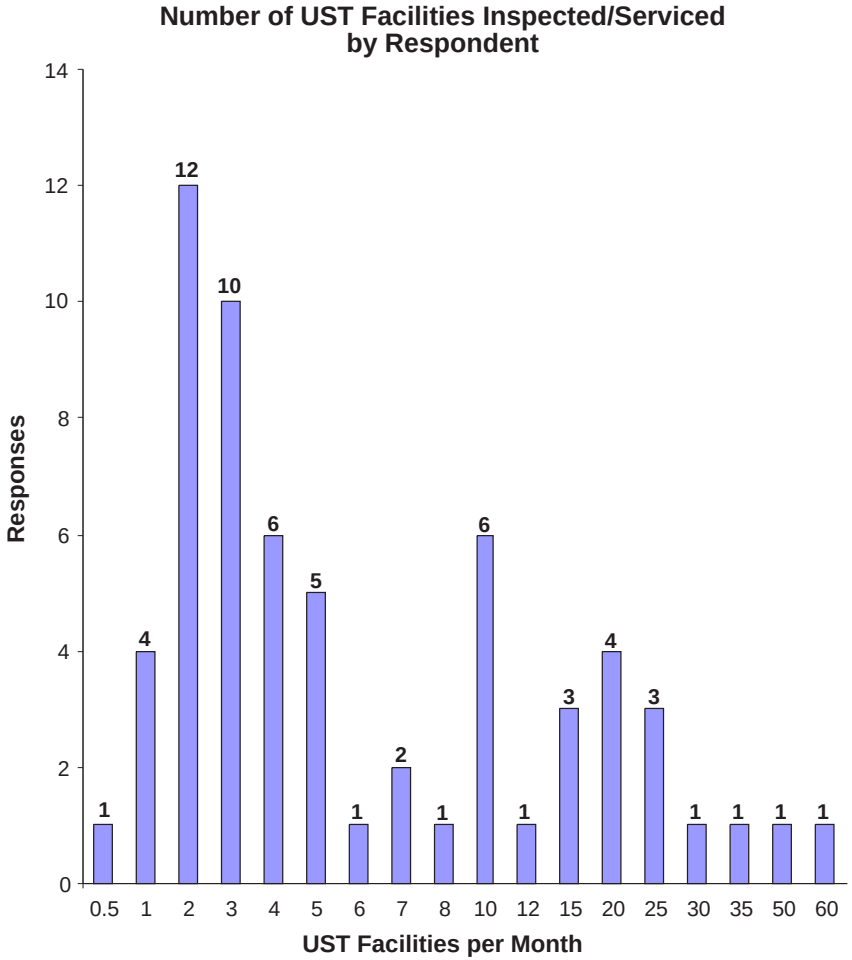
20. Do you have any other comments you would like to share with us? _____

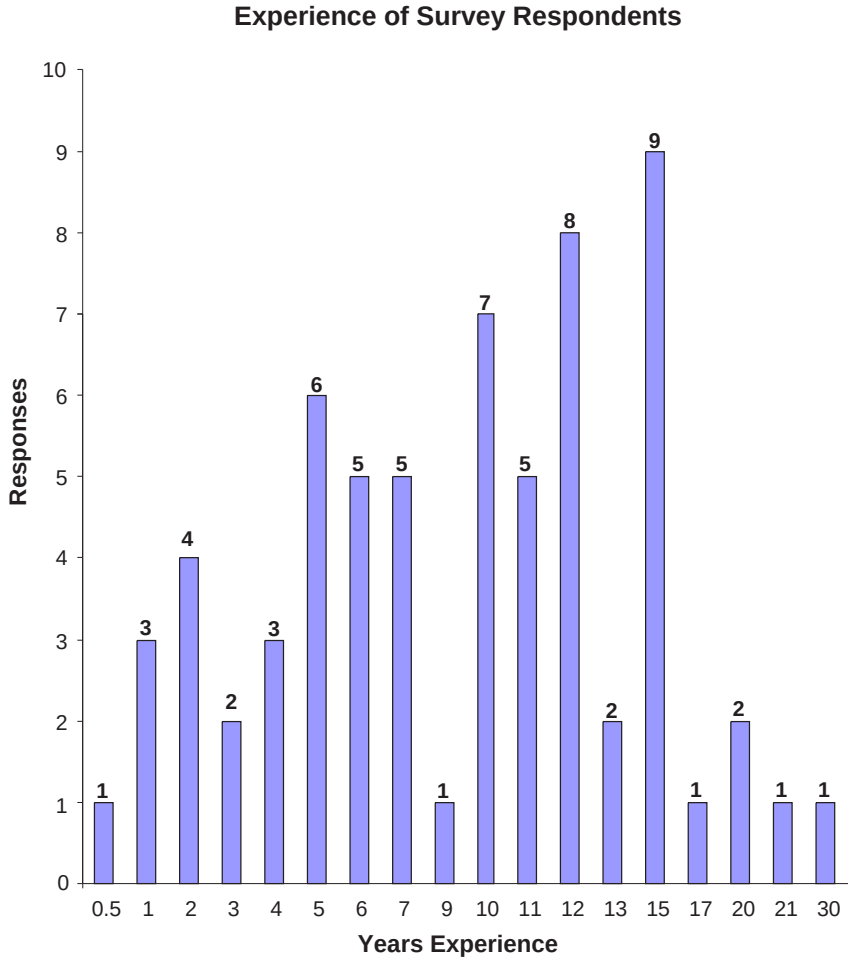
_____
_____
_____
_____

SWRCB Sensor Field Evaluation, Survey Results

71 local agency inspectors and service technicians responded to the survey. The following tables summarize their responses to a variety of questions on UST leak detection sensors.

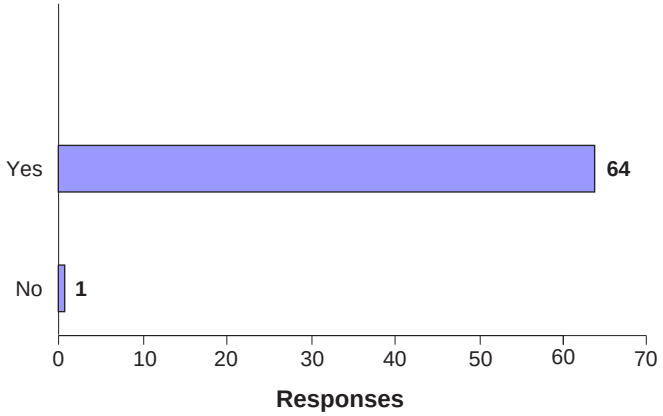
ABOUT THE RESPONDENTS



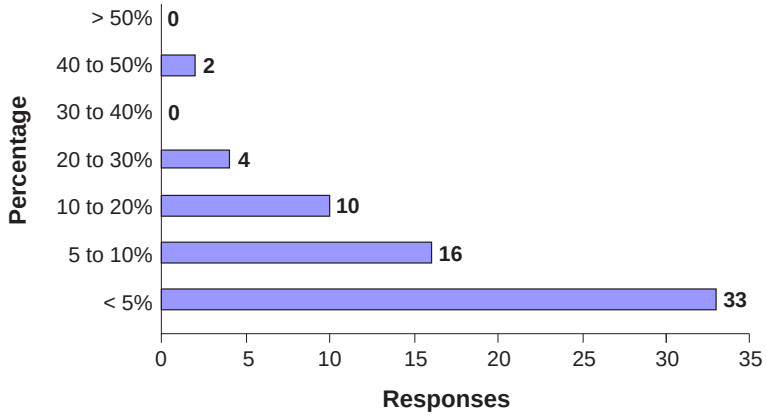


GENERAL SENSOR INFORMATION

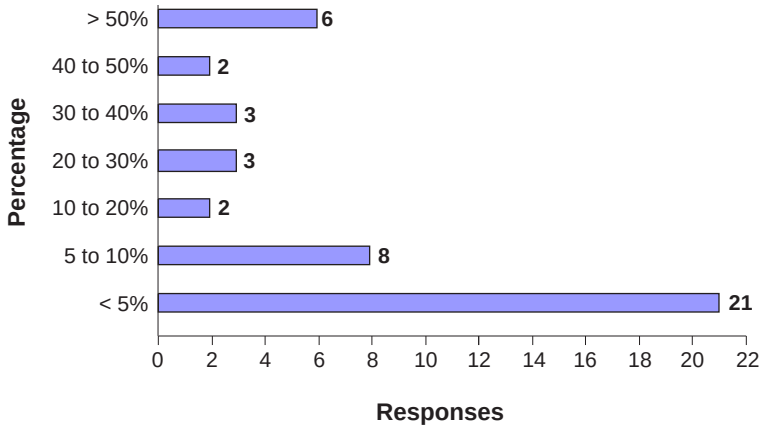
Do you Require Functional Test of Sensors?



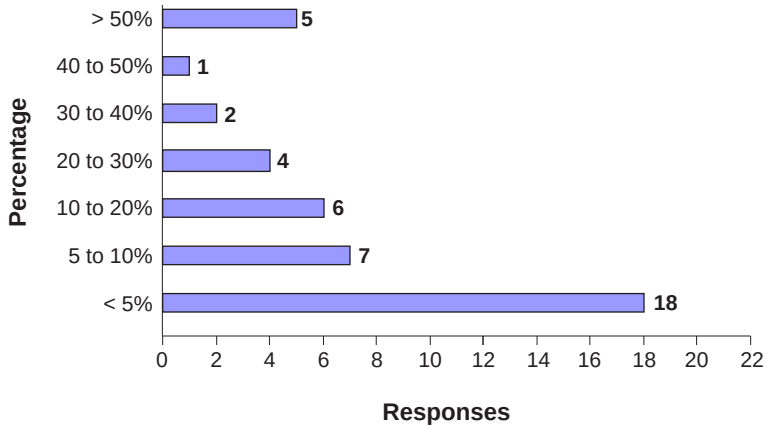
Percentage of Sensors Failing Functional Test

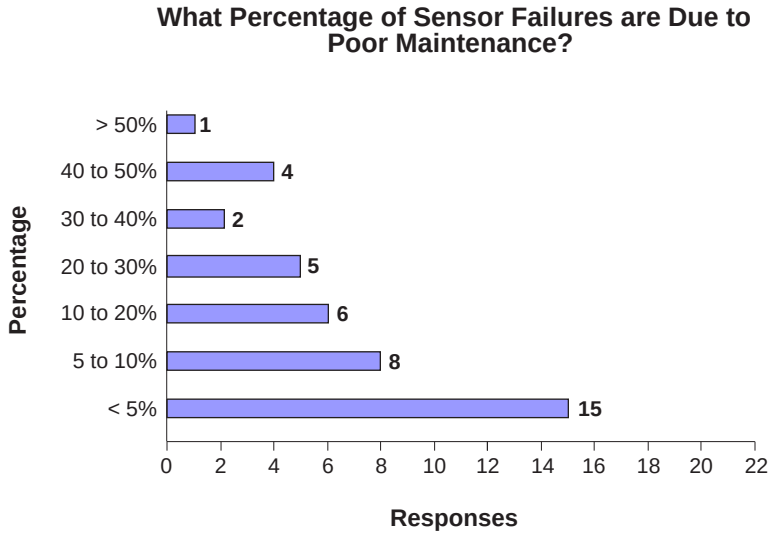


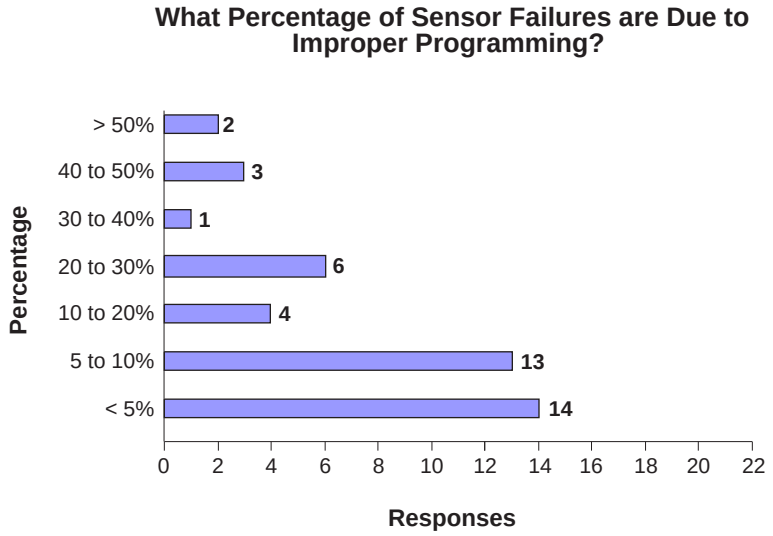
What Percentage of Sensor Failures are Due to Poor Design?

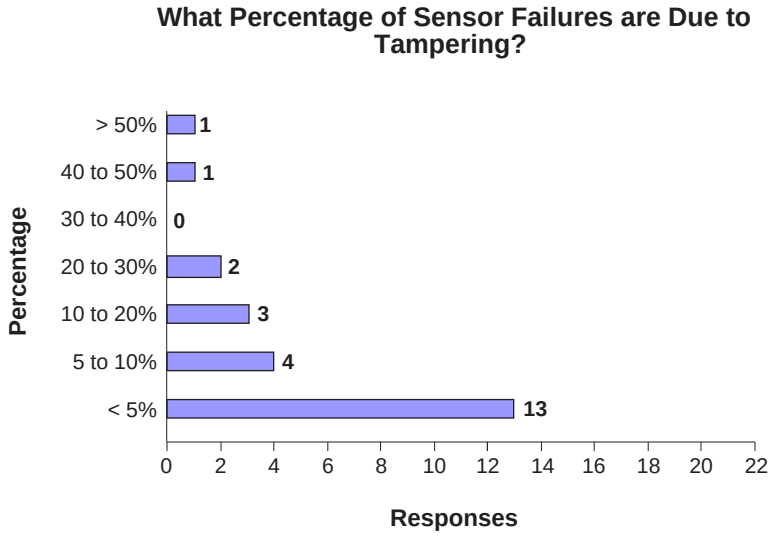


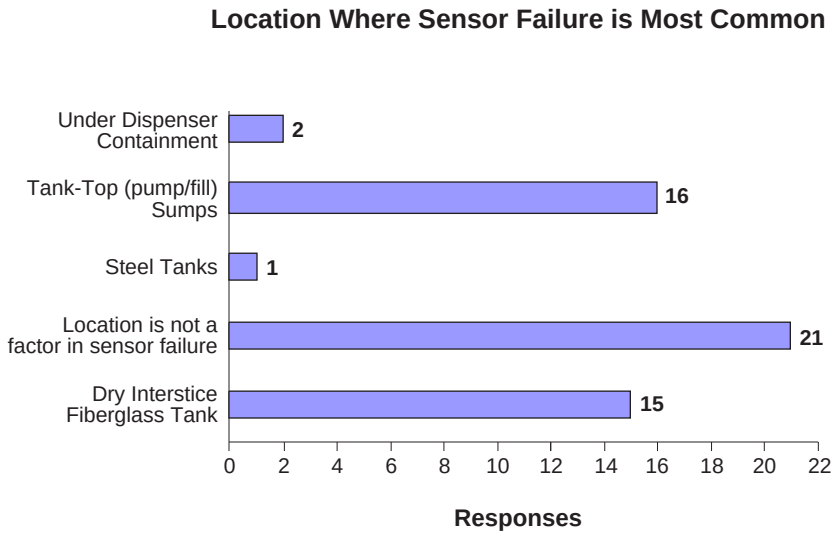
What Percentage of Sensor Failures are Due to Poor Installation?




What Percentage of Sensor Failures are Due to Poor Maintenance?
Percentage
> 50%
40 to 50%
30 to 40%
20 to 30%
10 to 20%
5 to 10%
< 5%
1
4
2
5
6
8
15
0 2 4 6 8 10 12 14 16 18 20 22
Responses

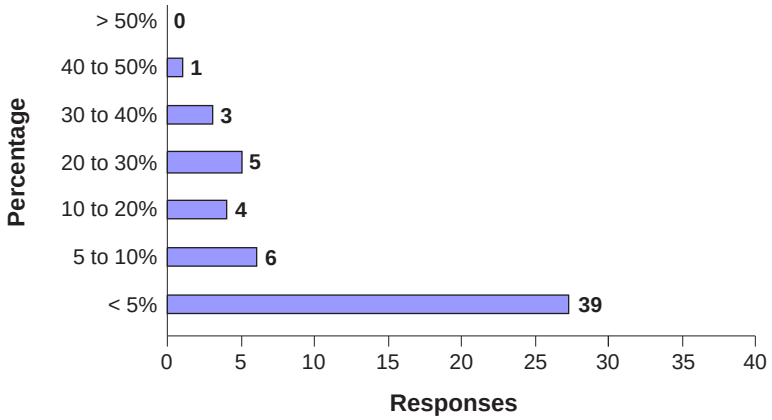

What Percentage of Sensor Failures are Due to Improper Programming?
Percentage
> 50%
40 to 50%
30 to 40%
20 to 30%
10 to 20%
5 to 10%
< 5%
2
3
1
6
4
13
14
0 2 4 6 8 10 12 14 16 18 20 22
Responses


What Percentage of Sensor Failures are Due to Tampering?
Percentage
> 50%
40 to 50%
30 to 40%
20 to 30%
10 to 20%
5 to 10%
< 5%
1
1
0
2
3
4
13
0 2 4 6 8 10 12 14 16 18 20 22
Responses

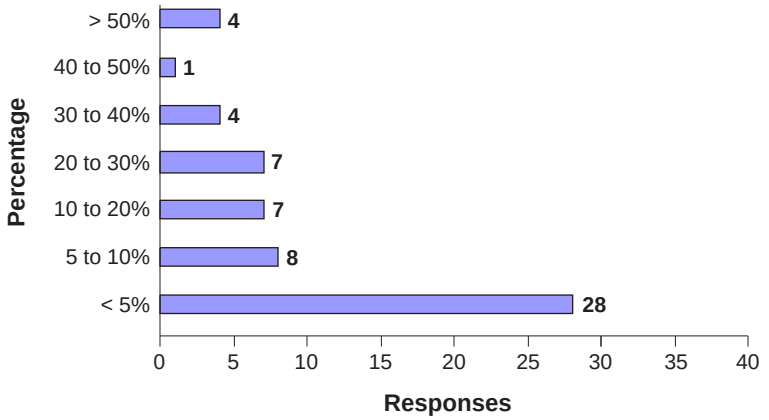

Location Where Sensor Failure is Most Common
Under Dispenser Containment
Tank-Top (pump/fill) Sumps
Steel Tanks
Location is not a factor in sensor failure
Dry Interstice Fiberglass Tank
2
16
1
21
15
0 2 4 6 8 10 12 14 16 18 20 22
Responses

DISCRIMINATING SENSOR INFORMATION

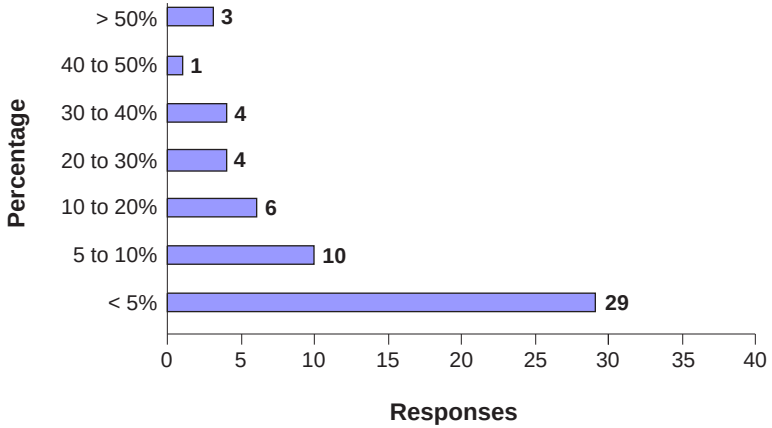
Percentage of Discriminating Sensors in Tank Interstice



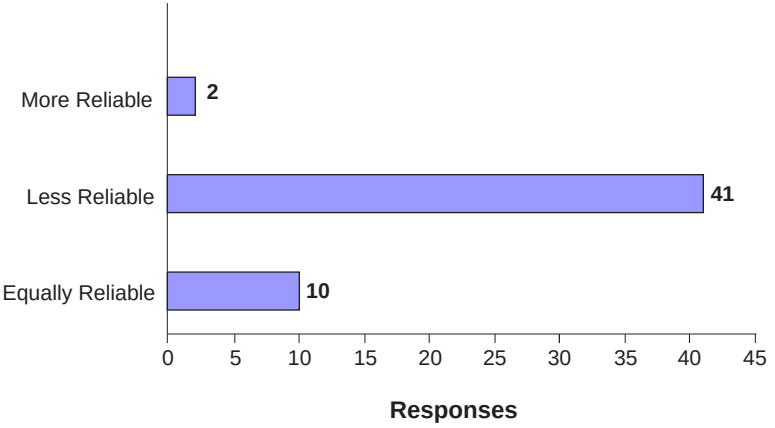
Percentage of Discriminating Sensors in Turbine Sumps



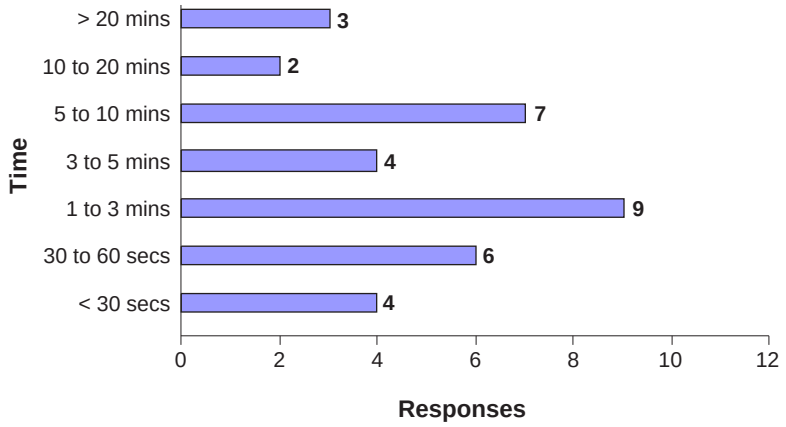
Percentage of Discriminating Sensors in UDC



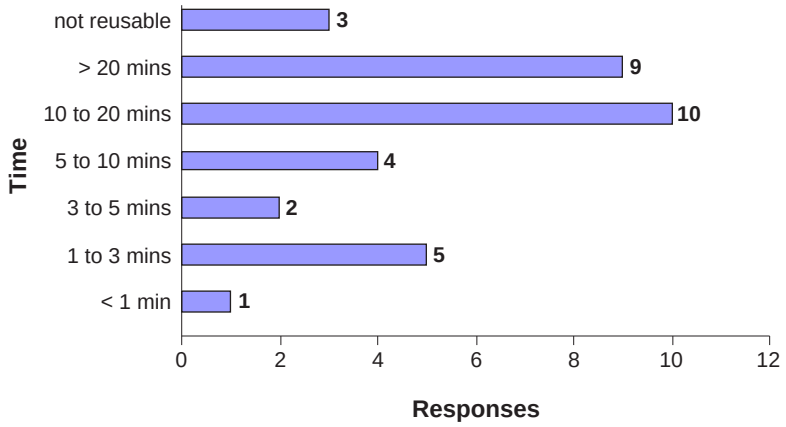
Reliability of Discriminating Sensors as Compared to Non-Discriminating



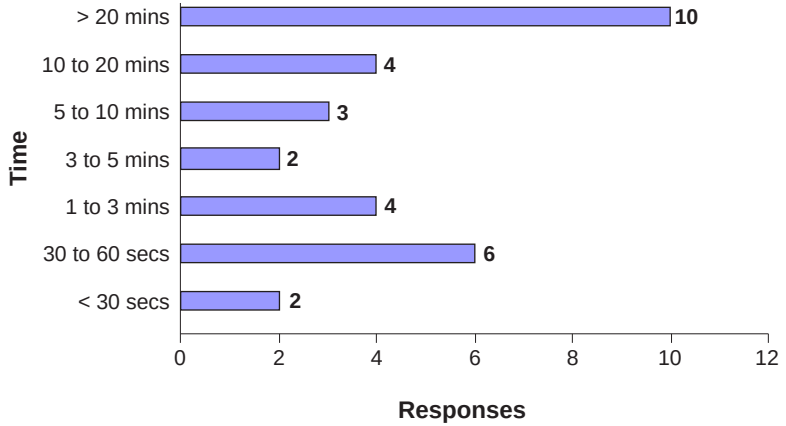
Discriminating Sensor Response Time in Unleaded Fuel



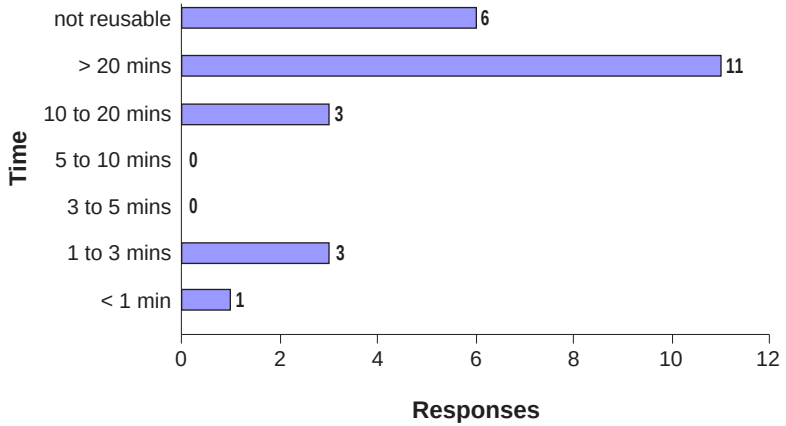
Discriminating Sensor Recovery Time in Unleaded Fuel

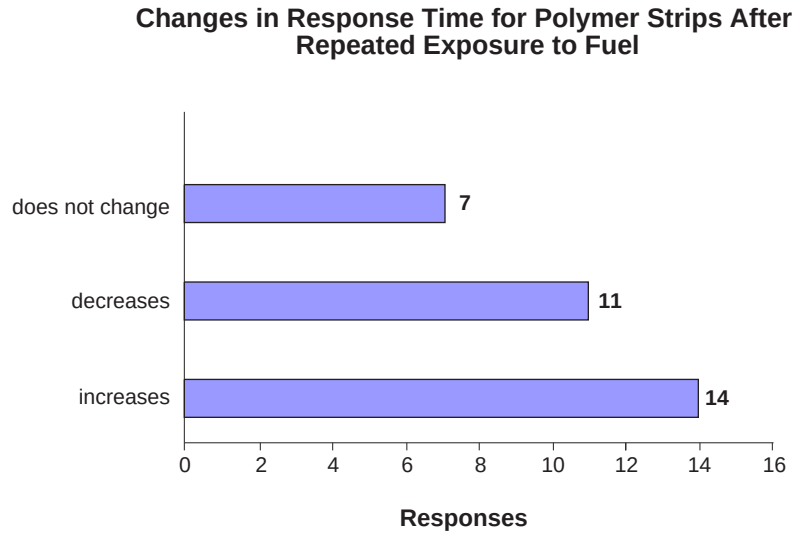


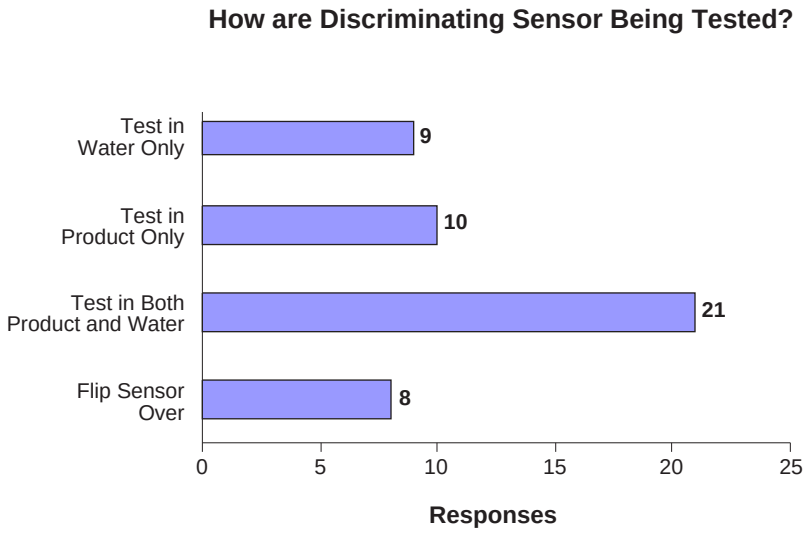
Discriminating Sensor Response Time in Diesel Fuel



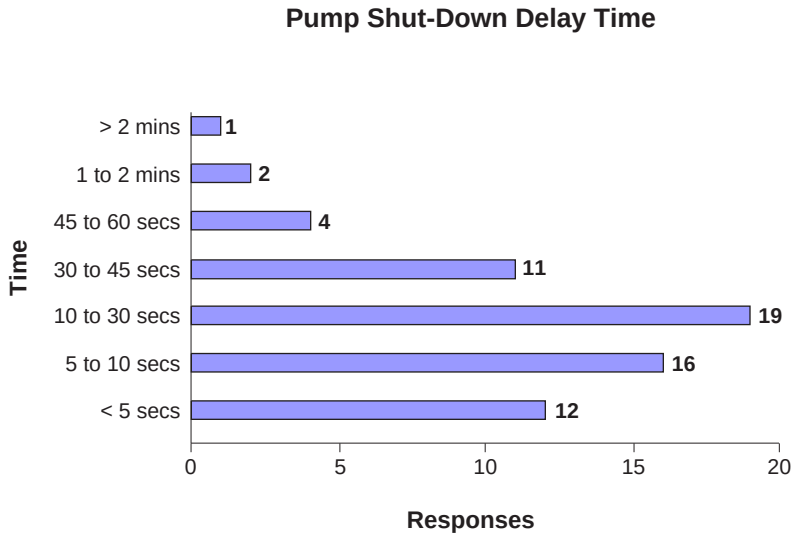
Discriminating Sensor Recovery Time in Diesel Fuel

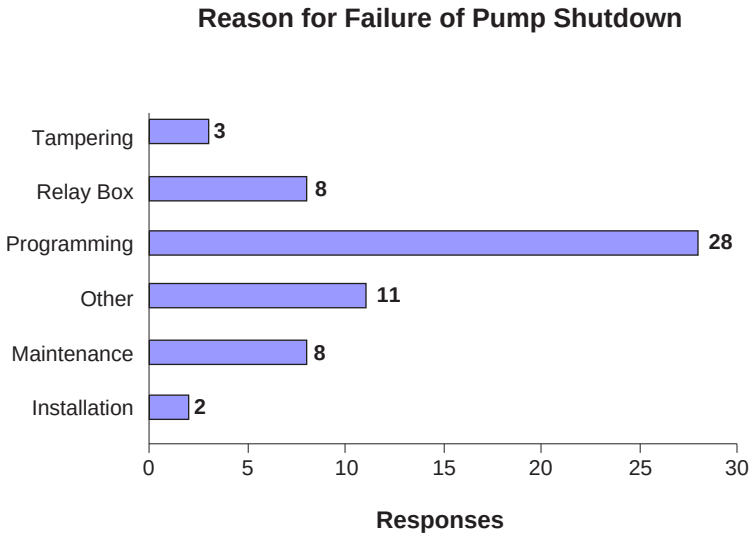






PUMP SHUT-DOWN INFORMATION





Online Survey Comments and Recommendations for the Sensor Field Evaluation of Underground Storage Tanks:

This is a compilation of comments and recommendations we received from our survey participants. These comments represent the views of the participants surveyed and may not reflect the opinions of the SWRCB.

- Discriminating sensors must be able to be tested in the actual product and must clear within a few minutes.
- Improve maintenance of sensors and replace outdated ones.
- The polymer strip type sensor appears to be a poor design for immediate identification of a leak. Remove this type from the approval list.
- Do not allow the use of sensors associated with the MSA Tankguard. I'm not sure, but I believe that they are polymer strip discriminating sensors. They have an extremely low response and recovery time of about 15-20 minutes. Also the sensitivity of the MSA Tankguard can be adjusted and always seems to need to be adjusted at each inspection. The alarm may not sound when the sensor is being tested in liquid, but then sound when it is not being tested. I do not trust the reliability of these sensors.
- Operator training, proper maintenance and tamper proofing.
- Eliminate discriminating sensors altogether in annular spaces. Heck, eliminate them everywhere. They are only good for sumps and containment areas that are so poorly constructed that liquid intrusion is a constant problem. Repairing the sumps would be a better solution to liquid intrusion problems.
- The positive shut down sump sensors are plastic and they stick open. Some type of new stick product is needed.
- You might want to require that all sensors be replaced regularly every 2-3 years.
- Eliminate discriminating sensors unless they have <5sec-response time. They need to be designed so that corrosion and sticking do not occur. Needs to be such that maintenance is minimized since this is only done annually.
- Require quarterly maintenance and inspection of sensors.
- Make them simple and easy to place. The Tri-State feature is best on systems that have no maintenance crew.
- Overall experience with discriminating sensors is minimal, but due to survey set cases/problems, we do not allow or will approve them for use in the city. Result is problematic.
- Better design, stronger materials, and no resistors at sensor end.
- Improve design on brands listed in question 10. Discriminating sensors are not practical. I do not test them due to recovery time. Sometimes they do not recover.
- I don't know if it is possible, but what if they made a sensor that was non-stick so that sludge would not hold the float, making it stuck. The contact points would also need to be sludge proof.
- Better installation practices. Sensors are not being hung at the correct location, i.e. at the bottom of the tank or sump.

- Eliminate discriminating sensors or improve technology. Operate and test sensors under various simulated conditions. Improve technology of annular float sensors in FG tanks to improve accessibility/visual inspection/simulated testing.

- Be there at the annual maintenance checks. You learn a lot, see a lot of the important violations and disrupt the business only once. The entire focus of my inspections is the leak detection systems for piping and tanks. They must work. Operators do not like to do leak detection manually. Pushing toward all electronic monitoring is essential for the future. Get the operators out of it. Have the ATG print out the monthly .2 gph-passing test for tanks at least once a month automatically. Then the operator saves this record for the inspection.

- Testers hate to test the discriminating sensors with product because they know they will have problems getting them cleared, if at all. If the sensors won't clear, then it must be replaced, and tested. On one occasion, the technician did not have a discriminating sensor replacement with him so he had to call his shop and have someone drive one out to the site. This kept that product offline for several hours. The facility operator was not happy.

- Get rid of sacrificial sensors, and require secondary containment for all piping!!!

- My primary objective in completing this survey is to expose the problems that I have encountered in trying to test the sensors for the MSA Tankguard system. All other sensors that I have encountered are sufficiently reliable.

- The compatibility of simple contact switch sensors with the control panels is not a major issue or an operational problem. The use of discriminating sensors is a major issue even when these sensors are used with a compatible control panel.

- We hardly see discriminating sensors. The alarm needs to go through a central alarm system in which case we will know of any release. Tampering defeats the purpose of monitoring. We find improper positioning of the probe/ raised probe 80 % of the sites. Water intrusion a real problem.

- A tank system that is properly constructed and maintained should never have liquid intrusion problems and therefore there is no need for discriminating sensors.

- Owners need a good, simple manual on the tank system components, requirements, and responsibilities: like "straight talk on tanks" in more detail. So many stations change hands and so many employees are dueless, that comprehensive explanation of UST's is desperately needed to start to get an unformed constituency.

- Bravo box float mechanisms for dispenser containment monitoring were not mentioned in this survey but have about a 50% failure rate due to debris or loose chains. SFSFD water tests all float monitored dispenser pans.

- Sensor reliability or rather the lack there of, has caused local agencies to all other leak detection and testing requirements to UST's. The confidence level in the sensors functioning properly at any given time is low, Because of this the confidence in our UST programs goal of preventing and detecting releases is also somewhat low. Why spend a lot of time and resources when the devices are unreliable? Also, this didn't address mechanical systems. The Bravo Float system has chronic problems with not functioning properly after more than a year. The float does not leave very much room for sidewalls of channels so dirt freezes the movement. Tampering by loosening chains is extremely common. We dislike this design.

- Phasing out existing monitoring systems. I.e. pollulert, petrometer, leak-x, petrovend, etc. Notion current LG-113 should be an eventually to start planning for now.

- Discriminating sensors add approximately 10 min. per sensor for testing and returning to operability. That adds about 2 hours to a standard gas station monitoring certification inspection.

- Question 13(d)- recovery time for diesel fuel is greater than 60 minutes.

- Please remove discriminating sensors from approved method. They are not reliable and/or do not sense for reasonable system monitoring (if located in sump bottom with water in sump a full leak will not be detected if the water level is above the sensor). Question 7-Sensor failure is most common in Tank Top (pump/fill) Sumps and Under Dispenser Containment.

- This survey should allow free-text answers. Some pick-list choices are inadequate. At the very least, there should be a "unknown" response.

- In the past when we arrived on site for an inspection, the maintenance contractor or operator may have already tested and replaced any faulty sensors. This will skew the data you collect from inspectors, indicating higher performance rates.

- People raising probes due to surface water infiltration via rain or steam cleaning the parking lot, which violates many laws.

- Alternate technologies should be available for positive shutdown, which do not rely on the relay boxes.

APPENDIX VI
Field Data

Sensor Field Data Tables

List of Acronyms

Acronym	Meaning
MR	Sensor is manually reset after an alarm
MSA	Mine Safety Appliances
NA	Not applicable to the sensor being tested
NP	Not programmed for pump shut-down
NT	Not tested
PSD	Pump shut-down
Rec	Recovery time (in seconds)
Resp	Response time (in seconds)
UDC	Under-dispenser containment
Unk	Unknown. Data was unavailable

List of Definitions

Term	Definition
Flip Test	Sensor was tested by flipping it over
Heights	All liquid levels are reported in inches
High Test	High-level water testing
Low Test	Low-level water testing. For single-level sensors tested in water, test data will be recorded in this column
Product	Sensor was tested in product
Site ID #200	The 67 sensors tested during Phase I (Veeder-Root discriminating sensors) are included in this database under Site ID# 200
Times	All response and recovery times are reported in seconds

APPENDIX VI, TABLE 1
Summary of All Failures

TABLE 1 - Summary of All Failures

Make Site ID	Model	Discriminating	At Low Point	Wired Properly	Flip Test Result	Flip PSD	Low Test Result	Low PSD	High Test Result	High PSD	Product Result	Product PSD	After testing sensor was
Alpha wire													
92	Unk	☑	Yes	Yes	Fail	NP	NT	NT	NA	NA	NT	NT	Re-Installed
Beaudreau													
82	406	☐	No	Yes	NA	NA	NT	NT	NA	NA	NT	NT	Unk
10	406	☐	Yes	Yes	NA	NA	Fail	NA	NA	NA	NT	NT	Re-Installed
Led indicator light was working on sensor, indicating that the wiring was properly connected. Sensor was reinstalled, meaning local agency has to follow up.													
10	406	☐	Yes	Yes	NA	NA	Fail	NA	NA	NA	NT	NT	Re-Installed
Led indicator light was working on sensor, indicating that the wiring was properly connected. Sensor was reinstalled, meaning local agency has to follow up.													
10	406	☐	Yes	Yes	NA	NA	Fail	NA	NA	NA	NT	NT	Re-Installed
Led indicator light was working on sensor, indicating that the wiring was properly connected. Sensor was reinstalled, meaning local agency has to follow up.													
Gilbarco													
28	PA02591144000	☐	Yes	Yes	Fail	NP	NT	NT	NA	NA	NT	NT	Replaced
Sensors was replaced by contractor two days after the inspection.													
28	PA02592000000	☐	Yes	Yes	Fail	No	NT	NT	NA	NA	NT	NT	Replaced
Sensors was replaced by contractor two days after the inspection and positive shut down was rewired.													
28	PA02592000000	☐	Yes	Yes	Fail	No	NT	NT	NA	NA	NT	NT	Replaced
Sensors was replaced by contractor two days after the inspection and positive shut down was rewired.													
98	PA02592000010	☐	No	Yes	NT	NT	Pass	Yes	NA	NA	NT	NT	Re-Installed
3-4 inches of water on both sides of sump (low spots of tank top).													
98	PA02592000010	☐	No	Yes	NT	NT	Pass	Yes	NA	NA	NT	NT	Re-Installed
2-3 inches of water on both sides of sump (low spots of tank top).													
24	PA02592000010	☐	Yes	Yes	Fail	No	NT	NT	NA	NA	NT	NT	Repaired
Relay was stuck, so the PSD failed when tested. It passed when re-tested.													
Incon													
16	TSP-ULS	☐	No	No	NT	NT	NT	NT	Fail	Yes	NT	NT	Repaired
Sensor was turned off when technician conducted the test. Sensor appears to have been turned due to water in the UDC. After turning the sensor on, it passed.													
35	TSP-ULS	☐	No	Yes	Pass	Yes	NT	NT	NA	NA	NT	NT	Re-Installed
The sump was full of diesel approximately 9 1/2 inches deep. The sensor was set at the top of the sump to avoid alarming.													
Mallory Controls													
92	Pollulert MD 241RRA	☑	Yes	Yes	NA	NA	NT	NT	NA	NA	Fail	No	Unk
Sensor failed the test, but the company is out of business.So, owner might have to change the system. Inspector gave the owner two weeks to fix it or replace It.													

All times are recorded in seconds, heights are recorded in inches.

Make / Site ID / Model	Discriminating	At Low Point	Wired Properly	Flip Test Result	Flip PSD	Low Test Result	Low PSD	High Test Result	High PSD	Product Result	Product PSD	After testing sensor was
MSA												
17 Tankgard 482607	☐	No	No	NA	NA	NT	NT	NA	NA	Fail	Yes	Repaired
Sensor initially turned off. Appears to have been turned off due to product in the sump. Sensor worked when turned on; sensor not at lowest point - about 8" above.												
17 Tankgard 482607	☐	Yes	Yes	NA	NA	NT	NT	NA	NA	Fail	No	Unk
Had to leave site before witnessing removal or re-installation of sensor.												
Red Jacket												
20 Liquid Refraction Sensor	☐	No	Yes	Pass	Yes	NT	NT	NA	NA	NT	NT	Re-Installed
Sensor has been pulled up due to high water in the fill/vapor sump.												
Ronan												
20 LS-3	☐	No	Yes	Fail	No	NT	NT	NA	NA	NT	NT	Unk
Sensor appears to be good during a continuity test, but appears not to be hooked up to the control panel.												
47 LS-3	☐	Yes	No	Fail	Yes	NT	NT	NA	NA	NT	NT	Repaired
Sensor would not come out of alarm after testing. Pump would not come on. Contractor repaired the facility. Problem was wiring inside the building, near the control panel.												
20 LS-3	☐	Yes	No	Fail	No	NT	NT	NA	NA	NT	NT	Unk
Sensor appeared to be functional when technician tested for continuity, but did not activate an alarm at the panel. Tech suspects problem with wiring between sensor and panel.												
32 LS-3	☐	Yes	Yes	Fail	NP	NT	NT	NA	NA	NT	NT	Repaired
Float was stuck. Technician had to shake it to loosen it, then sensor went into alarm.												
1 LS-7	☐	No	Yes	Pass	NP	NT	NT	NA	NA	NT	NT	Re-Installed
The sensor could not be taken out of the tank interstice; therefore the sensor was activated within the tank.												
Universal												
94 LALS-1	☐	Yes	Yes	Fail	NA	NT	NT	NA	NA	NT	NT	Unk
Contractor waited for 2 minutes for the sensor to response, but never did. Sensor had to be replaced.												
95 LALS-1	☐	Yes	Yes	NA	NA	Fail	No	NA	NA	NT	NT	Unk
Sensor was not tested because it was stuck in the interstitial space.												
94 LAVS-1	☐	Yes	Yes	NA	NA	Fail	No	NA	NA	NT	NT	Unk
Veeder-Root												
85 794380-208	☐	No	Yes	Fail	No	NT	NT	NA	NA	NT	NT	Replaced
The contractor decided to stop testing the sensor after it failed to respond for more than 2 minutes and replace it with a new sensor.												
10 794380-208	☐	No	Yes	Fail	No	NT	NT	NA	NA	NT	NT	Re-Installed
Alarm activated at the control panel, but no pump shutdown. (printer said pump shutdown occurred, but pump continued to run. Picture of sensor is site 7 #2.). Follow up was done on this site and Inspector confirmed that the PSD is functioning properly.												
91 794380-208	☐	No	Yes	NT	NT	Pass	Yes	NA	NA	NT	NT	Re-Installed
Fill bucket was detached. Stick was in the product line (to prevent the flapper from shutting down the flow)												

Site ID	Make / Model	Discriminating	At Low Point	Wired Properly	Flip Test Result	Flip PSD	Low Test Result	Low PSD	High Test Result	High PSD	Product Result	Product PSD	After testing sensor was
91	794380-208	☐	No	Yes	NT	NT	Pass	Yes	NA	NA	NT	NT	Re-Installed
Fill bucket was detached. Stick was in the product line (to prevent the flapper from shutting down the flow)													
91	794380-208	☐	No	Yes	NT	NT	Pass	Yes	NA	NA	NT	NT	Re-Installed
Fill bucket was detached. Stick was in the product line (to prevent the flapper from shutting down the flow)													
91	794380-208	☐	No	Yes	NT	NT	Pass	Yes	NA	NA	NT	NT	Re-Tested
Sensor timed out & Technician had to go and re-set it to shut down the pump.													
91	794380-208	☐	No	Yes	NT	NT	Pass	Yes	NA	NA	NT	NT	Re-Installed
Fill bucket was detached. Stick was in the product line (to prevent the flapper from shutting down the flow). Most of sensors timed out & Technician had to go and re-set it to shut down the pump.													
91	794380-208	☐	No	Yes	NT	NT	Pass	Yes	NA	NA	NT	NT	Re-Tested
Sensor timed out & Technician had to go and re-set it to shut down the pump.													
91	794380-208	☐	No	Yes	NT	NT	Pass	Yes	NA	NA	NT	NT	Re-Tested
Sensor timed out & Technician had to go and re-set it to shut down the pump.													
91	794380-208	☐	No	Yes	NT	NT	Pass	Yes	NA	NA	NT	NT	Re-Tested
Sensor timed out & Technician had to go and re-set it to shut down the pump.													
42	794380-208	☐	No	Yes	Pass	NP	NT	NT	NA	NA	NT	NT	Re-Installed
Contains a substantial amount of water.													
76	794380-208	☐	No	Yes	Pass	NP	NT	NT	NA	NA	NT	NT	Re-Installed
73	794380-208	☐	No	Yes	Pass	Yes	NT	NT	NA	NA	NT	NT	Re-Installed
Sensor was raised about 4 inches from the bottom of the sump.													
33	794380-208	☐	No	Yes	Pass	NP	NT	NT	NA	NA	NT	NT	Re-Installed
33	794380-208	☐	No	Yes	Pass	NP	NT	NT	NA	NA	NT	NT	Re-Installed
33	794380-208	☐	No	Yes	Pass	NP	NT	NT	NA	NA	NT	NT	Re-Installed
33	794380-208	☐	No	Yes	Pass	NP	NT	NT	NA	NA	NT	NT	Re-Installed
33	794380-208	☐	No	Yes	Pass	NP	NT	NT	NA	NA	NT	NT	Re-Installed
33	794380-208	☐	No	Yes	Pass	NP	NT	NT	NA	NA	NT	NT	Re-Installed
79	794380-208	☐	No	Yes	Pass	Yes	NT	NT	NA	NA	NT	NT	Re-Installed
Product is leaking out of the top of the turbine pump.													
79	794380-208	☐	No	Yes	Pass	Yes	NT	NT	NA	NA	NT	NT	Re-Installed
Product is leaking out of the top of the turbine pump.													
79	794380-208	☐	No	Yes	Pass	Yes	NT	NT	NA	NA	NT	NT	Re-Installed
Product is leaking out of the top of the turbine pump.													
42	794380-208	☐	No	Yes	Pass	Yes	NT	NT	NA	NA	NT	NT	Re-Installed
The sensor was not located at the lowest point in the tank. Technician lowered it and activetd an alarm.													

Make Site ID / Model	Discriminating	At Low Point	Wired Properly	Flip Test Result	Flip PSD	Low Test Result	Low PSD	High Test Result	High PSD	Product Result	Product PSD	After testing sensor was
76 794380-208	☐	No	Yes	Pass	NP	NT	NT	NA	NA	NT	NT	Re-Installed
62 794380-208	☐	No	Yes	Pass	NP	NT	NT	NA	NA	NT	NT	Re-Installed
2-3 gallons of product in the sump. Sensor was raised above the product level. Sensor in pump sump was not programmed to shut down pump.												
62 794380-208	☐	No	Yes	Pass	NP	NT	NT	NA	NA	NT	NT	Re-Installed
2-3 gallons of product in the sump. Sensor was raised above the product level. Sensor in pump sump was not programmed to shut down pump.												
42 794380-208	☐	No	Yes	Pass	Yes	NT	NT	NA	NA	NT	NT	Re-Installed
85 794380-208	☐	No	Yes	Pass	Yes	NT	NT	NA	NA	NT	NT	Re-Installed
There was a hole in the sump, approximately 1 1/2" diam. Electrical wiring below penetration lines. Hydrostatic test was performed to the highest penetration lines at 16 minutes per cycle.Test at 16 psi and fail if below 12 psi. Fill sump is not clean..												
10 794380-208	☐	No	Yes	Pass	Yes	NT	NT	NA	NA	NT	NT	Re-Installed
2 sensors, 1 raised in sump and the other was a the lowest point. Both responded and activated pump shut off. Picture of sensor was taken.												
88 794380-208	☐	Yes	Yes	Fail	No	NT	NT	NA	NA	NT	NT	Replaced
Technician waited for over 2 minutes, but sensor did not alarm. Finally inspector decided to call the test off and replace the sensor. Testing was done on the new sensor and it passed.												
200 794380-341	☑	Unk	Unk	NA	NA	Unk	Unk	NA	NA	Fail	Unk	Unk
200 794380-341	☑	Unk	Unk	NA	NA	Unk	Unk	NA	NA	Fail	Unk	Unk
19 794380-341	☑	Yes	Yes	NA	NA	NT	NT	NA	NA	Fail	No	Replaced
Replaced with same type of sensor.												
38 794380-341	☑	Yes	Yes	NA	NA	NT	NT	NA	NA	Fail	NA	Replaced
Sensor was tested with both unleaded gasoline and waste oil. Both cases, water alarms were observed. Sensor was not approved for use in waste oil. After testing, sensor was replaced and it passed the product test.												
38 794380-341	☑	Yes	Yes	NA	NA	Pass	NA	NA	NA	Fail	No	Replaced
Sensor sets water alarm for product test. After testing the sensor was replaced and the new sensor was setting the right alarm.												
38 794380-341	☑	Yes	Yes	NA	NA	Pass	NA	NA	NA	Fail	No	Replaced
Sensor sets water alarm for product test. After testing, sensor was replaced and the new sensor was setting the right alarm.												
64 794380-341	☑	Yes	Yes	NA	NA	Pass	Yes	NA	NA	Fail	Yes	Unk
Detected product as water. Since pump shuts down for product or water, Local Agency did not require sensor to be changed. Owner will replace sensor or re-program as non-discriminating.												
77 794380-341	☑	Yes	Yes	NA	NA	Pass	Yes	NA	NA	Fail	Yes	Repaired
Technician had to clean the sensor with a rag completely (especially in the small window at sensor's center) before fuel could be detected. After cleaning sensor did detect fuel.												
64 794380-341	☑	Yes	Yes	NA	NA	Pass	Yes	NA	NA	Fail	Yes	Unk
Detected product as water. Since pump shuts down for product or water, Local Agency did not require sensor to be changed. Owner will replace sensor or reprogram as non-discriminating.												
77 794380-341	☑	Yes	Yes	NA	NA	Pass	Yes	NA	NA	Fail	Yes	Repaired
Technician had to clean the sensor with a rag completely (especially in the small window at sensor's center) before fuel could be detected. After cleaning sensor did detect fuel.												
77 794380-341	☑	Yes	Yes	NA	NA	Pass	Yes	NA	NA	Fail	Yes	Repaired
Technician had to clean the sensor with a rag completely (especially in the small window at sensor's center) before fuel could be detected. After cleaning sensor did detect fuel.												
84 794380-350	☑	Yes	Yes	NA	NA	Pass	NA	Pass	Yes	Fail	Yes	Replaced
Sensor did not come out of alarm after being tested in product, so technician replaced it.												

Make Site ID / Model	Discriminating	At Low Point	Wired Properly	Flip Test Result	Flip PSD	Low Test Result	Low PSD	High Test Result	High PSD	Product Result	Product PSD	After testing sensor was
84 794380-350	☑	Yes	Unk	NA	NA	Pass	NA	Fail	No	Fail	No	Re-Installed
Technician suspected a problem with the wiring at this site.												
84 794380-350	☑	Yes	Unk	NA	NA	Pass	NA	Fail	No	Fail	No	Re-Installed
Sensor alarmed, but failed PSD. Problem with the relay is suspected.												
84 794380-350	☑	Yes	No	NA	NA	Pass	NA	Fail	No	Fail	No	Replaced
Sensor did not respond during high water or product testing. Technician suspected wiring problem, since sensor was replaced but test results did not change.												
22 794380-352	☑	No	Yes	NT	NT	Fail	No	Pass	Yes	NT	NT	Re-Installed
Sensor's low float did not activate (would not reset). Sensor was replaced by the owner without informing the local agnecy nor the contractor who does the routine inspection. Apparently, they did not retest sensor's functinality.												
200 794380-352	☑	Unk	Unk	NT	NT	Unk	Unk	Pass	Unk	Fail	Unk	Unk
200 794380-352	☑	Unk	Unk	NT	NT	Unk	Unk	Pass	Unk	Fail	Unk	
82 794380-352	☑	Yes	No	NT	NT	NT	NT	NT	NT	NT	NT	Unk
Wiring malfunctioning.												
82 794380-352	☑	Yes	No	NT	NT	NT	NT	NT	NT	NT	NT	Unk
Wiring malfunctioning.												
65 794390-205	☐	No	Yes	NT	NT	NT	NT	NA	NA	Pass	NA	Re-Installed
Sump had oil in it. Sensor was raised above the oil, but alarmed when technician lowered it into the oil. Contractor was notified to pump out the oil that day.												
46 794390-205	☐	No	Yes	Pass	Yes	NT	NT	NA	NA	NT	NT	Re-Installed
Sensor was raised approximately 1 foot from bottom of the sump.												
29 794390-407	☐	No	No	NT	NT	NT	NT	NA	NA	NT	NT	Repaired
The sensor was located at the top of the tank, at the access port. The pull-string was broken. Inspector said sensor must be fixed immediately. The sensor was not functionally tested during this inspection. Afollow up was done & sensor was repaired.												
73 794390-407	☐	Yes	Yes	Fail	NP	NT	NT	NA	NA	NT	NT	Repaired
Sensor would not go into alarm until the techician shook it vigorously. Float was stuck. Interstice was moist, but not enough liquid to activate an alarm.												
73 794390-407	☐	Yes	Yes	Fail	NP	NT	NT	NA	NA	NT	NT	Repaired
Sensor would not go into alarm until the techician shook it vigorously. Float was stuck.												
81 794390-409	☐	Unk	Unk	Fail	NP	NT	NT	NA	NA	NT	NT	Re-Installed
Sensor was wedged between the primary and secondary tank walls and cannot be removed to verify sensor type. Alarm was not set at the control panel by pulling it like the prevous two tanks.												
81 794390-409	☐	Unk	Yes	Fail	NP	NT	NT	NA	NA	NT	NT	Re-Installed
Sensor was wedged between the primary and secondary tank walls and cannot be removed to verify sensor type. Alarm was set at the control panel by pulling it. The response time was estimated because there was no way of knowing when sensor was triggered.												
51 794390-420	☐	NA	Yes	Fail	NP	NT	NT	NA	NA	NT	NT	Unk
The sensor was missing the float. Follow up was made with local agency and confirmed that the technician repaired the sensor. However, inspector did not peform re-inspection.												
55 794390-420	☐	No	Yes	Pass	NP	NT	NT	NA	NA	NT	NT	Unk
This sensor is for steel tanks, and could not be wrapped around the FG tank. Local agency instructed owner to replace.												

Make / Site ID / Model	Discriminating	At Low Point	Wired Properly	Flip Test Result	Flip PSD	Low Test Result	Low PSD	High Test Result	High PSD	Product Result	Product PSD	After testing sensor was
89 794390-420	☐	No	Yes	Pass	Yes	NT	NT	NA	NA	NT	NT	Re-Installed
Interstitial space is full of water. Technician could not put back the sensor without calling the maintenance to remove water. Sensor was not at lowest point and wire was wrapped up.												
99 794390-420	☐	No	No	Pass	NP	NT	NT	NA	NA	NT	NT	
Waste oil contained oil/water around the tank sump. The sensor was not located in the lowest point.												
89 794390-420	☐	No	Yes	Pass	Yes	NT	NT	NA	NA	NT	NT	Re-Installed
23 794390-420	☐	Yes	Yes	Fail	NP	NT	NT	NA	NA	NT	NT	Replaced
Original sensor was stuck in the interstice because of rust on casing; sensor was replaced. New sensor passed test.												
Warrick Controls												
7 DLP-1-NC	☐	Yes	Yes	Fail	NP	NT	NT	NA	NA	NT	NT	Re-Tested
Sensor was sitting in water and not alarmed. Contractor shook sensor and float moved activating the alarm. Sensor passed retest after 1-2 second alarm response.												

APPENDIX VI, TABLE 2
Field Data for Non-discriminating Sensors

TABLE 2 - Field Data for Non-Discriminating Sensor

Sensor Location	Panel Make	Panel Model	At Low Point	Wiring OK	Condition of Location	Liquid Testing Resp	Liquid Testing Rec	Liquid Testing Alarm	Liquid Testing PSD	Liquid Testing Result	Flip Testing Resp	Flip Testing Rec	Flip Testing Alarm	Flip Testing PSD	Flip Testing Result
Sensor Make: Beaudreau															
Sensor Model: 404					**Operating Principle:** Float Switch										
UDC	Veeder-Root	TLS-300	Yes	Yes	Clean/Dry	3	1	Product	NA	Pass	NT	NT	NT	NT	NT
Sensor Model: 406					**Operating Principle:** Optical										
UDC	Beaudreau	404-4 Cut-off	Yes	Yes	Clean/Dry	1	2	Both	NA	Pass	NA	NA	NA	NA	NA
Sensor shuts off power to dispenser.															
UDC	Beaudreau	404-4 Cut-off	Yes	Yes	Clean/Dry	1	2	Both	NA	Pass	NA	NA	NA	NA	NA
Sensor shuts off power to dispenser.															
UDC	Beaudreau	404-4 Cut-off	Yes	Yes	Clean/Dry	2	2	Both	NA	Pass	NA	NA	NA	NA	NA
Sensor shuts off power to dispenser.															
UDC	Beaudreau	404-4 Cut-off	Yes	Yes	Clean/Dry	2	2	Both	NA	Pass	NA	NA	NA	NA	NA
Sensor shuts off power to dispenser.															
UDC	Beaudreau	404-4 Cut-off	Yes	Yes	Clean/Dry	2	2	Both	NA	Pass	NA	NA	NA	NA	NA
Sensor shuts off power to dispenser.															
UDC	Beaudreau	404-4 Cut-off	No	Yes	Debris	NT	NT	NT	NT	NT	NA	NA	NA	NA	NA
UDC	Beaudreau	404-4 Cut-off	Yes	Yes	Clean/Dry	None	NA	None	NA	Fail	NA	NA	NA	NA	NA
Led indicator light was working on sensor, indicating that the wiring was properly connected. Sensor was reinstalled, meaning local agency has to follow up.															
UDC	Beaudreau	404-4 Cut-off	Yes	Yes	Clean/Dry	None	NA	None	NA	Fail	NA	NA	NA	NA	NA
Led indicator light was working on sensor, indicating that the wiring was properly connected. Sensor was reinstalled, meaning local agency has to follow up.															
UDC	Beaudreau	404-4 Cut-off	Yes	Yes	Clean/Dry	None	NA	None	NA	Fail	NA	NA	NA	NA	NA
Led indicator light was working on sensor, indicating that the wiring was properly connected. Sensor was reinstalled, meaning local agency has to follow up.															
UDC	Beaudreau	404-4 Cut-off	Yes	Yes	Clean/Dry	1	2	Both	NA	Pass	NA	NA	NA	NA	NA
Sensor shuts off power to dispenser.															
UDC	Beaudreau	404-4 Cut-off	Yes	Yes	Clean/Dry	1	1	Both	NA	Pass	NA	NA	NA	NA	NA
The sensor was tested in a cup for total darkness and shut off the valve at the dispenser.															
UDC	Beaudreau	404-4 Cut-off	Yes	Yes	Clean/Dry	2	5	Both	NA	Pass	NA	NA	NA	NA	NA
UDC	Beaudreau	404-4 Cut-off	Yes	Yes	Debris	NT	NT	NT	NT	NT	NA	NA	NA	NA	NA
Debris and dust accumulated over the years.															

All times are recorded in seconds and heights in inches.

Sensor Location	Panel Make	Panel Model	At Low Point	Wiring OK	Condition of Location	Liquid Testing Resp	Rec	Alarm	PSD	Result	Flip Testing Resp	Rec	Alarm	PSD	Result
UDC	Beaudreau	404-4 Cut-off	Yes	Yes	Clean/Dry	15	1	Both	NA	Pass	NA	NA	NA	NA	NA
UDC	Beaudreau	404-4 Cut-off	Yes	Yes	Clean/Dry	1	1	Both	Yes	Pass	NA	NA	NA	NA	NA
Sensor failed testing 6 weeks earlier. Technician replaced control module (located under dispenser) and now sensor worked.															
UDC	Beaudreau	404-4 Cut-off	Yes	Yes	Clean/Dry	1	1	Both	Yes	Pass	NA	NA	NA	NA	NA
Sensor failed testing 6 weeks earlier. Technician replaced control module (located under dispenser) and now sensor worked.															
UDC	Beaudreau	404-4 Cut-off	Yes	Yes	Clean/Dry	1	1	Both	Yes	Pass	NA	NA	NA	NA	NA
Sensor failed testing 6 weeks earlier. Technician replaced control module (located under dispenser) and now sensor worked.															
UDC	Beaudreau	404-4 Cut-off	Yes	Yes	Clean/Dry	1	1	Both	Yes	Pass	NA	NA	NA	NA	NA
Sensor failed testing 6 weeks earlier. Technician replaced control module (located under dispenser) and now sensor worked.															
UDC	Beaudreau	404-4 Cut-off	Yes	Yes	Clean/Dry	1	1	Both	NA	Pass	NA	NA	NA	NA	NA
UDC	Beaudreau	404-4 Cut-off	Yes	Yes	Clean/Dry	1	1	Both	NA	Pass	NA	NA	NA	NA	NA
UDC	Beaudreau	404-4 Cut-off	Yes	Yes	Clean/Dry	1	1	Both	NA	Pass	NA	NA	NA	NA	NA
UDC	Beaudreau	404-4 Cut-off	Yes	Yes	Clean/Dry	1	1	Both	NA	Pass	NA	NA	NA	NA	NA
UDC	Beaudreau	404-4 Cut-off	Yes	Yes	Clean/Dry	1	1	Both	NA	Pass	NA	NA	NA	NA	NA
UDC	Beaudreau	404-4 Cut-off	Yes	Yes	Clean/Dry	1	1	Both	NA	Pass	NA	NA	NA	NA	NA

Sensor Make: Emco

Sensor Model: Q0003-006 **Operating Principle:** Optical

Tank Interstice	Emco	EECO 3000	Yes	Yes	Clean/Dry	60	60	Product	NA	Pass	NA	NA	NA	NA	NA
Tank Interstice	Emco	EECO 3000	Yes	Yes	Clean/Dry	60	60	Product	NA	Pass	NA	NA	NA	NA	NA
Tank Interstice	Emco	EECO 3000	Yes	Yes	Clean/Dry	60	60	Product	NA	Pass	NA	NA	NA	NA	NA
Tank Interstice	Emco	EECO 3000	Yes	Yes	Clean/Dry	60	60	Product	NA	Pass	NA	NA	NA	NA	NA

Sensor Model: Q0003-010 **Operating Principle:** Optical

Pump Sump	Emco Wheaton	Leak Sensor II	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	NA	NA	NA	NP	NA
~8 oz water in cup; panel did not support ATG, only good for open/close sensor response; pressure operating principle?															
Tank Interstice	Emco Wheaton	Leak Sensor II	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	NA	NA	NA	NA	NA
~8 oz water in cup; panel did not support ATG, only good for open/close sensor response; pressure operating principle?															

Sensor Make: Gilbarco

Sensor Model: PA02591144000 **Operating Principle:** Float Switch

Sensor Location	Panel Make	Panel Model	At Low Point	Wiring OK	Condition of Location	*Liquid Testing*					*Flip Testing*				
						Resp	Rec	Alarm	PSD	Result	Resp	Rec	Alarm	PSD	Result
Pump Sump	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Sensor is Gilbarco equivalent of VR model -208.															
Pump Sump	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Sensor is Gilbarco equivalent of VR model -208.															
Pump Sump	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Sensor is Gilbarco equivalent of VR model -208.															
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	360	1	Both	NP	Pass
Unable to remove and observe waste oil UST overfill sesor. Technician was able to to activate sensor within the tank.															
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	720	1	Both	NP	Pass
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Product	NP	Pass
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	720	1	Both	NP	Pass
Mid-grade and Premium share the same annular space; some condensation; sensor casing split.															
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Product	NP	Pass
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	None	NA	None	NP	Fail
Sensors was replaced by contractor two days after the inspection.															
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Product	NP	Pass
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	NP	Pass
This was a two-compartment tank (midgrade and premium). The casing of the sensor was split and took the form of a bell.															
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	NP	Pass
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	8	5	Product	NA	Pass	NT	NT	NT	NT	NT
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	9	5	Product	NA	Pass	NT	NT	NT	NT	NT
Soil in the access area for this sensor was stained dark with diesel fuel from unknown source. Possibly overfill or surface water ingress.															
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Water	NT	NT	NT	NT	NT	Unk	Unk	Product	NP	Pass
Alarm was set during the removal of the sensor from the tank interstice. Sensor was also covered with dirty water.															
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Product	NP	Pass

All times are recorded in seconds and heights in inches.

Sensor Location	Panel Make	Panel Model	At Low Point	Wiring OK	Condition of Location	Liquid Testing Resp	Liquid Testing Rec	Liquid Testing Alarm	Liquid Testing PSD	Liquid Testing Result	Flip Testing Resp	Flip Testing Rec	Flip Testing Alarm	Flip Testing PSD	Flip Testing Result
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	NP	Pass
Sensor is Gilbarco equivalent of VR model -420.															
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	NP	Pass
Sensor is Gilbarco equivalent of VR model -420.															
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	NP	Pass
Sensor is Gilbarco equivalent of VR model -420.															

Sensor Model: PA02592000000 **Operating Principle:** Float Switch

Sensor Location	Panel Make	Panel Model	At Low Point	Wiring OK	Condition of Location	Liquid Testing Resp	Liquid Testing Rec	Liquid Testing Alarm	Liquid Testing PSD	Liquid Testing Result	Flip Testing Resp	Flip Testing Rec	Flip Testing Alarm	Flip Testing PSD	Flip Testing Result
Pump Sump	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	840	5	Both	NP	Pass
LLD failed the 3 gph leak test. Needs replacement.															
Pump Sump	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	No	Fail
Sensors was replaced by contractor two days after the inspection and positive shut down was rewired.															
Pump Sump	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	No	Fail
Sensors was replaced by contractor two days after the inspection and positive shut down was rewired.															
Pump Sump	Gilbarco	EMC	Yes	Yes	Product	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Pump Sump	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	1	Both	Yes	Pass
Pump Sump	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	840	5	Both	NP	Pass
Pump Sump	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	840	5	Both	NP	Pass
Pump Sump	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass

Sensor Model: PA02592000010 **Operating Principle:** Float Switch

Sensor Location	Panel Make	Panel Model	At Low Point	Wiring OK	Condition of Location	Liquid Testing Resp	Liquid Testing Rec	Liquid Testing Alarm	Liquid Testing PSD	Liquid Testing Result	Flip Testing Resp	Flip Testing Rec	Flip Testing Alarm	Flip Testing PSD	Flip Testing Result
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Pump Sump	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Pump Sump	Gilbarco	EMC	Yes	Yes	Product	NT	NT	NT	NT	NT	10	1	Both	Yes	Pass
Pump Sump	Gilbarco	EMC	Yes	Yes	Product	NT	NT	NT	NT	NT	10	1	Both	Yes	Pass
Pump Sump	Gilbarco	EMC	Yes	Yes	Product	NT	NT	NT	NT	NT	30	1	Both	No	Fail
Relay was stuck, so the PSD failed when tested. It passed when re-tested.															
Pump Sump	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Pump Sump	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Pump Sump	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass

All times are recorded in seconds and heights in inches.

Sensor Location	Panel Make	Panel Model	At Low Point	Wiring OK	Condition of Location	*Liquid Testing* Resp	Rec	Alarm	PSD	Result	*Flip Testing* Resp	Rec	Alarm	PSD	Result
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Pump Sump	Gilbarco	EMC	No	Yes	Water	5	5	Product	Yes	Pass	NT	NT	NT	NT	NT
3-4 inches of water on both sides of sump (low spots of tank top).															
Pump Sump	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	7	10	Product	Yes	Pass
Flip test used since cable was too short to remove from sump for water test.															
Pump Sump	Gilbarco	EMC	No	Yes	Water	8	8	Product	Yes	Pass	NT	NT	NT	NT	NT
2-3 inches of water on both sides of sump (low spots of tank top).															
Pump Sump	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Pump Sump	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Pump Sump	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Sensor Model: PA0259300000-2				**Operating Principle:** Float Switch											
Tank Interstice	Gilbarco	EMC	NA	Yes	Brine-Filled	5	5	Product	Yes	Pass	NT	NT	NT	NT	NT
Pump shut down on high and low level alarms.															
Tank Interstice	Gilbarco	EMC	NA	Yes	Brine-Filled	5	5	Product	Yes	Pass	NT	NT	NT	NT	NT
Pump shut down on high and low level alarms.															
Sensor Make: Incon															
Sensor Model: TS-ILS				**Operating Principle:** Optical											
Tank Interstice	Incon	1000ER	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	NA	NA	NA	NA	NA
Sensor Model: TSP-HIS				**Operating Principle:** Float Switch											
Tank Interstice	Incon	TS-1000	Yes	Yes	Brine-Filled	NT	NT	NT	NT	NT	15	Unk	Product	NP	Pass
The sensor is Incon (double floats) continuously monitors the interstitial space.It was tested for both high level and low level alarms.															
Tank Interstice	Incon	TS-1000	Yes	Yes	Brine-Filled	NT	NT	NT	NT	NT	10	Unk	Product	NP	Pass
Sensor Model: TSP-ULS				**Operating Principle:** Float Switch											
Fill Sump	Incon	TS-1000	No	Yes	Product	NT	NT	NT	NT	NT	1	15	Product	Yes	Pass
The sump was full of diesel approximately 9 1/2 inches deep. The sensor was set at the top of the sump to avoid alarming.															
Fill Sump	Incon	TS-1000EFI	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	Unk	Both	Yes	Pass
Pump Sump	Incon	Unk	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Both	NP	Pass
Small metal casing with holes at bottom of sensor for liquid to enter; console had printer and ATG capability.															

Sensor Location	Panel Make	Panel Model	At Low Point	Wiring OK	Condition of Location	*Liquid Testing* Resp	Rec	Alarm	PSD	Result	*Flip Testing* Resp	Rec	Alarm	PSD	Result
Pump Sump	Incon	Unk	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Both	NP	Pass
Small metal casing with holes at bottom of sensor for liquid to enter; console had printer and ATG capability.															
Pump Sump	Incon	1000ER	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Pump Sump	Incon	TS-1000	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	Unk	Product	NP	Pass
This facility does not have a positive shut-down feature.															
Pump Sump	Incon	TS-1000	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	Unk	Product	NP	Pass
Pump Sump	Incon	TS-1000EFI	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	25	Unk	Both	Yes	Pass
Pump Sump	Incon	TS-1000	Yes	Yes	Water	NT	NT	NT	NT	NT	1	15	Product	Yes	Pass
Tank Interstice	Incon	1000ER	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Tank Interstice	Incon	TS-1000	NA	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	15	Product	Yes	Pass
Tank Interstice	Incon	Unk	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Both	NP	Pass
Small metal casing with holes at bottom of sensor for liquid to enter; console had printer and ATG capability.															
Tank Interstice	Incon	Unk	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Both	NP	Pass
Small metal casing with holes at bottom of sensor for liquid to enter; console had printer and ATG capability.															
UDC	Incon	TS-1000	Yes	Yes	Product	NT	NT	NT	NT	NT	1	15	Product	Yes	Pass
There was a substantial amount of product in the UDC. There seemed to be a leak in the piping under the dispenser. It was in alarm on arrival.															
UDC	Incon	1000ER	No	No	Water	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Sensor was turned off when technician conducted the test. Sensor appears to have been turned due to water in the UDC. After turning the sensor on, it passed.															

Sensor Make: MSA

Sensor Model: Tankgard 482607 **Operating Principle:** Thermal Conductivity

Pump Sump	MSA	Tankguard	Yes	Yes	Water	NT	NT	NT	NT	NT	NA	NA	NA	NA	NA
Pump Sump	MSA	Tankguard	No	No	Water	NT	NT	NT	NT	NT	NA	NA	NA	NA	NA
Sensor initially turned off. Appears to have been turned off due to product in the sump. Sensor worked when turned on; sensor not at lowest point - about 8" above.															
Pump Sump	MSA	Tankguard	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	NA	NA	NA	NA	NA
Had to leave site before witnessing removal or re-installation of sensor.															
Tank Interstice	MSA	Tankguard	Unk	Unk	Water	NT	NT	NT	NT	NT	NA	NA	NA	NA	NA
Sensor also is monitoring the presense of antifreeze, which shared the tank with the waste oil.															
Tank Interstice	MSA	Tankguard	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	NA	NA	NA	NA	NA

Sensor Make: Owens-Corning Tank

Sensor Location	Panel Make	Panel Model	At Low Point	Wiring OK	Condition of Location	*Liquid Testing* Resp	Rec	Alarm	PSD	Result	*Flip Testing* Resp	Rec	Alarm	PSD	Result
Sensor Model: FHRB 810				**Operating Principle:** Float Switch											
Tank Interstice	Veeder-Root	TLS-350	NA	Yes	Brine-Filled	NT	NT	NT	NT	NT	20	Unk	Both	NP	Pass
This single sensor monitors the regular-mid-premium tanks; two reservoirs are used (left and right) and both must be activated for the alarm to go off.															
Sensor Make: PermAlert															
Sensor Model: PSTV				**Operating Principle:** Float Switch											
Tank Interstice	Red Jacket	PPM 4000	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	3	Unk	Both	Yes	Pass
Sensor Make: Pneumeractor															
Sensor Model: LS 600LD				**Operating Principle:** Float Switch											
Pump Sump	Pneumeractor	LC-1000	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Product	Yes	Pass
Unknown sensor type, photo taken. Flip test was done because sensor wiring prevented removal of the sensor (wiring too short).															
Pump Sump	Pneumeractor	LC-1000	Unk	Yes	Water	NT	NT	NT	NT	NT	2	Unk	Product	NP	Pass
Water in sumps was below level of the sensor. Flip test was done due to wiring being too short. No labels or markings on the sensor. Picture was taken.															
Pump Sump	Pneumeractor	LC-1000	Unk	Yes	Water	NT	NT	NT	NT	NT	2	Unk	Product	NP	Pass
Sensor Make: Red Jacket															
Sensor Model: Liquid Refraction Sensor				**Operating Principle:** Optical											
Fill Sump	Red Jacket	PPM 4000	No	Yes	Water/Debris	NT	NT	NT	NT	NT	2	Unk	Both	Yes	Pass
Sensor has been pulled up due to high water in the fill/vapor sump.															
Sensor Model: RE400-111-5				**Operating Principle:** Float Switch											
Pump Sump	Red Jacket	STL 1801	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Pump Sump	Red Jacket	STL 1401	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Pump Sump	Red Jacket	STL 1401	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Pump Sump	Red Jacket	STL 1801	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Pump Sump	Red Jacket	STL 1401	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Pump Sump	Red Jacket	STL 1801	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Sensor Model: Unk				**Operating Principle:** Float Switch											
Pump Sump	Veeder-Root	TLS-300	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Product	Yes	Pass

Sensor Location	Panel Make	Panel Model	At Low Point	Wiring OK	Condition of Location	Liquid Testing Resp	Liquid Testing Rec	Liquid Testing Alarm	Liquid Testing PSD	Liquid Testing Result	Flip Testing Resp	Flip Testing Rec	Flip Testing Alarm	Flip Testing PSD	Flip Testing Result

Sensor Make: Ronan

Sensor Model: LS-3 **Operating Principle:** Float Switch

Sensor Location	Panel Make	Panel Model	At Low Point	Wiring OK	Condition of Location	Liquid Resp	Liquid Rec	Liquid Alarm	Liquid PSD	Liquid Result	Flip Resp	Flip Rec	Flip Alarm	Flip PSD	Flip Result
Fill Sump	Ronan	X76S	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Fail
Float was stuck. Technician had to shake it to loosen it, then sensor went into alarm.															
Fill Sump	Ronan	X761VCS-3LXi	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Product	Yes	Pass
Fill Sump	Ronan	X761VCS-3LXi	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Product	Yes	Pass
Fill Sump	Ronan	X76S	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Product	Yes	Pass
Fill Sump	Ronan	X76S	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Product	Yes	Pass
Fill Sump	Ronan	X76S	Yes	Yes	Water	NT	NT	NT	NT	NT	1	1	Product	Yes	Pass
Slight amount of water in fill sump. Not enough to activate an alarm.															
Fill Sump	Ronan	X761VCS-3LXi	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Product	Yes	Pass
Fill Sump	Ronan	X76S	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Fill Sump	Red Jacket	PPM 4000	No	Yes	Water/Debris	NT	NT	NT	NT	NT	Unk	Unk	None	No	Fail
Sensor appears to be good during a continuity test, but appears not to be hooked up to the control panel.															
Monitoring Well	EBW	AutoStik Jr. 4	Yes	Yes	Backfill	NT	NT	NT	NT	NT	1	1	Product	NP	Pass
Sensor is a custom version of the LS3-A. It is made of stainless steel and is resistant to the chemicals stored in the system.															
Monitoring Well	EBW	AutoStik Jr. 4	Yes	Yes	Backfill	NT	NT	NT	NT	NT	1	1	Product	NP	Pass
Sensor is a custom version of the LS3-A. It is made of stainless steel and is resistant to the chemicals stored in the system.															
Monitoring Well	EBW	AutoStik Jr. 4	Yes	Yes	Backfill	NT	NT	NT	NT	NT	1	1	Product	NP	Pass
Sensor is a custom version of the LS3-A. It is made of stainless steel and is resistant to the chemicals stored in the system.															
Monitoring Well	EBW	AutoStik Jr. 4	Yes	Yes	Backfill	NT	NT	NT	NT	NT	1	1	Product	NP	Pass
Sensor is a custom version of the LS3-A. It is made of stainless steel and is resistant to the chemicals stored in the system.															
Monitoring Well	EBW	AutoStik Jr. 4	Yes	Yes	Backfill	NT	NT	NT	NT	NT	1	1	Product	NP	Pass
Sensor is a custom version of the LS3-A. It is made of stainless steel and is resistant to the chemicals stored in the system.															
Monitoring Well	EBW	AutoStik Jr. 4	Yes	Yes	Backfill	NT	NT	NT	NT	NT	1	1	Product	NP	Pass
Sensor is a custom version of the LS3-A. It is made of stainless steel and is resistant to the chemicals stored in the system.															
Monitoring Well	EBW	AutoStik Jr. 4	Yes	Yes	Backfill	NT	NT	NT	NT	NT	1	1	Product	NP	Pass
Sensor is a custom version of the LS3-A. It is made of stainless steel and is resistant to the chemicals stored in the system.															
Monitoring Well	EBW	AutoStik Jr. 4	Yes	Yes	Backfill	NT	NT	NT	NT	NT	1	1	Product	NP	Pass
Sensor is a custom version of the LS3-A. It is made of stainless steel and is resistant to the chemicals stored in the system.															

Sensor Location	Panel Make	Panel Model	At Low Point	Wiring OK	Condition of Location	*Liquid Testing* Resp	Rec	Alarm	PSD	Result	*Flip Testing* Resp	Rec	Alarm	PSD	Result
Pump Sump	Ronan	X76-4X	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Pump Sump	Ronan	X76S	Yes	Yes	Water	NT	NT	NT	NT	NT	2	2	Both	NP	Pass
Pump Sump	Ronan	X76S	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Product	Yes	Pass
Fail-safe was verified operational.															
Pump Sump	Ronan	X76VS	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	1	Product	Yes	Pass
Pump Sump	Ronan	X76S	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Product	Yes	Pass
Fail-safe was verified operational.															
Pump Sump	Ronan	X76S	Yes	No	Clean/Dry	NT	NT	NT	NT	NT	3	NA	Product	Yes	Fail
Sensor would not come out of alarm after testing. Pump would not come on. Contractor repaired the facility. Problem was wiring inside the building, near the control panel.															
Pump Sump	Ronan	X76S	Yes	Yes	Water	NT	NT	NT	NT	NT	1	1	Both	Yes	Pass
Pump Sump	Ronan	X76S	Yes	Yes	Water	NT	NT	NT	NT	NT	1	1	Both	Yes	Pass
Pump Sump	Ronan	X76S	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Product	Yes	Pass
Fail-safe was verified operational.															
Pump Sump	Red Jacket	PPM 4000	Yes	No	Water	NT	NT	NT	NT	NT	none	NA	None	No	Fail
Sensor appeared to be functional when technician tested for continuity, but did not activate an alarm at the panel. Tech suspects problem with wiring between sensor and panel.															
Pump Sump	Ronan	Unk	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Unk	NP	Pass
This site has a suction system and a tank sump.															
Pump Sump	Ronan	X761VCS-3LXi	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Product	Yes	Pass
Pump Sump	Red Jacket	PPM 4000	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	3	Unk	Both	Yes	Pass
After follow up with local agency, inspector confirmed that the technician replaced fill sump sensor and replaced the broken wire in the monitor.															
Pump Sump	Ronan	X76LVC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Product	Yes	Pass
Pump Sump	Ronan	X76LVC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Product	Yes	Pass
Pump Sump	Ronan	X76VS	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	1	Product	Yes	Pass
Pump Sump	Ronan	X76S	Yes	Yes	Water	NT	NT	NT	NT	NT	1	2	Both	NP	Pass
Pump Sump	Ronan	X76S	Yes	Yes	Water	NT	NT	NT	NT	NT	2	2	Both	NP	Pass
Pump Sump	Ronan	X76VS	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	1	Product	Yes	Pass
Sensor was on its side and slightly upside-down, but not in alarm. Sensor did alarm when fully flipped over. Tech re-installed sensor properly after testing.															
Pump Sump	Ronan	X76LVC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	NP	Pass
Pump Sump	Ronan	X761VCS-3LXi	Yes	Yes	Water	NT	NT	NT	NT	NT	2	2	Product	Yes	Pass
Pump Sump	Ronan	X76LVC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Product	Yes	Pass

Sensor Location	Panel Make	Panel Model	At Low Point	Wiring OK	Condition of Location	*Liquid Testing* Resp	Rec	Alarm	PSD	Result	*Flip Testing* Resp	Rec	Alarm	PSD	Result
Pump Sump	Ronan	X76S	Yes	Yes	Water	NT	NT	NT	NT	NT	2	2	Both	NP	Pass
Pump Sump	Ronan	X76LVC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	NP	Pass
Pump Sump	Ronan	X761VCS-3LXi	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Product	Yes	Pass
Pump Sump	Ronan	X76-4X	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Pump Sump	Ronan	X76-4X	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Tank Interstice	Ronan	X76S	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Product	NP	Pass
Tank Interstice	Ronan	X76LVC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Product	NP	Pass
Tank Interstice	Ronan	X76S	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Tank Interstice	Ronan	X76S	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Tank Interstice	Red Jacket	PPM 4000	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	3	Unk	Both	Yes	Pass
Tank Interstice	Ronan	X76S	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Product	NP	Pass
Tank Interstice	Ronan	X76S	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
UDC	Ronan	X76-4X	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
UDC	Ronan	X76-4X	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
UDC	Ronan	X76-4X	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
UDC	Ronan	X76-4X	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
UDC	Ronan	X76-4X	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	11	Both	NP	Pass
UDC	Ronan	X76-4X	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
UDC	Ronan	X76-4X	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
UDC	Ronan	X76-4X	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass

Sensor Model: LS-30 **Operating Principle:** Float Switch

Sensor Location	Panel Make	Panel Model	At Low Point	Wiring OK	Condition of Location	*Liquid Testing* Resp	Rec	Alarm	PSD	Result	*Flip Testing* Resp	Rec	Alarm	PSD	Result
Tank Interstice	Ronan	X76S	NA	Yes	Brine-Filled	NT	NT	NT	NT	NT	2	2	Both	NP	Pass
Tank Interstice	Ronan	X76S	NA	Yes	Brine-Filled	NT	NT	NT	NT	NT	2	2	Both	NP	Pass
Tank Interstice	Ronan	Unk	NA	Yes	Unk	3	3	Water	NA	Pass	NT	NT	NT	NT	NT
Ronan- LS-30 hydrostatic in generator tank.															
Tank Interstice	Ronan	X76S	NA	Yes	Brine-Filled	NT	NT	NT	NT	NT	2	2	Both	NP	Pass
Tank Interstice	Ronan	X76S	NA	Yes	Brine-Filled	NT	NT	NT	NT	NT	2	2	Both	NP	Pass

All times are recorded in seconds and heights in inches.

Sensor Location	Panel Make	Panel Model	At Low Point	Wiring OK	Condition of Location	*Liquid Testing* Resp	Rec	Alarm	PSD	Result	*Flip Testing* Resp	Rec	Alarm	PSD	Result
Sensor Model: LS-7					**Operating Principle:** Float Switch										
Tank Interstice	Ronan	X76S	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Product	NP	Pass
Technician pulled wire and pull string at the same time. This lifts the sensor off the bottom of the tank interstice and allows the float to fall, activating the alarm.															
Tank Interstice	Ronan	X76S	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Product	NP	Pass
Technician pulled wire and pull string at the same time. This lifts the sensor off the bottom of the tank interstice and allows the float to fall, activating the alarm.															
Tank Interstice	Ronan	X76S	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Product	NP	Pass
Technician pulled wire and pull string at the same time. This lifts the sensor off the bottom of the tank interstice and allows the float to fall, activating the alarm.															
Tank Interstice	Ronan	X76S	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	3	1	Product	NP	Pass
Tank Interstice	Ronan	X76S	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	3	1	Product	NP	Pass
Tank Interstice	Ronan	X76LVC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	4	4	Product	NP	Pass
Tank Interstice	Ronan	X76-4X	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Tank Interstice	Ronan	X76VS	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Product	NP	Pass
Alarm was activated by shaking sensor while still in tank interstice.															
Tank Interstice	Ronan	X76LVC	No	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	NP	Pass
The sensor could not be taken out of the tank interstice; therefore the sensor was activated within the tank.															
Tank Interstice	Ronan	X76VS	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Product	NP	Pass
Sensor had to be re-installed with a fish-tape because the string was broken. This took the contractor about 1 hour.															
Tank Interstice	Ronan	X76S	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	3	1	Product	NP	Pass
Tank Interstice	Ronan	X76LVC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	NP	Pass
Tank Interstice	Ronan	X76VS	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Product	NP	Pass
Alarm was activated by shaking sensor while still in tank interstice.															
Tank Interstice	Ronan	X76LVC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	3	3	Product	NP	Pass
Tank Interstice	Ronan	X76-4X	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Tank Interstice	Ronan	X76-4X	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Tank Interstice	Ronan	X76LVC	NA	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	NP	Pass
Tank Interstice	Ronan	X76VS	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Product	NP	Pass
Alarm was activated by shaking sensor while still in tank interstice.															
Sensor Model: Unk					**Operating Principle:** Float Switch										
Tank Interstice	Veeder-Root	TLS-300	NA	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Product	Yes	Pass

Sensor Location	Panel Make	Panel Model	At Low Point	Wiring OK	Condition of Location	Liquid Testing Resp	Liquid Testing Rec	Liquid Testing Alarm	Liquid Testing PSD	Liquid Testing Result	Flip Testing Resp	Flip Testing Rec	Flip Testing Alarm	Flip Testing PSD	Flip Testing Result

Sensor Make: Universal

Sensor Model: LALS-1 **Operating Principle:** Thermal Conductivity

Sensor Location	Panel Make	Panel Model	At Low Point	Wiring OK	Condition of Location	Liquid Resp	Liquid Rec	Liquid Alarm	Liquid PSD	Liquid Result	Flip Resp	Flip Rec	Flip Alarm	Flip PSD	Flip Result
Fill Sump	Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	1	Unk	Both	Yes	Pass	NA	NA	NA	NA	NA
Sensor activates an audible alarm and shuts down pump at the dispenser.															
Fill Sump	Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	1	Unk	Both	Yes	Pass	NA	NA	NA	NA	NA
Sensor activates an audible alarm and shuts down pump at the dispenser.															
Piping Sump	Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	1	Unk	Both	Yes	Pass	NA	NA	NA	NA	NA
Sensor activates an audible alarm and shuts down pump at the dispenser.															
Pump Sump	Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	2	Unk	Product	NA	Pass	NA	NA	NA	NA	NA
Pump Sump	Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	3	2	Water	Yes	Pass	NA	NA	NA	NA	NA
Pump Sump	Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	2	2	Water	Yes	Pass	NA	NA	NA	NA	NA
Pump Sump	Universal	Leak Alert LA-08	Yes	Yes	Vapor Odor	NT	NT	NT	NT	NT	1	1	Product	NP	Pass
Contractor blows on the sensor to activate the alarm. Sensor responds instantly. Sumps had been recently refinished and had strong chemical smell, not fuel.															
Pump Sump	Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	2	Unk	Product	NA	Pass	NA	NA	NA	NP	NA
Pump Sump	Universal	Leak Alert LA-08	Yes	Yes	Vapor Odor	NT	NT	NT	NT	NT	1	1	Product	NP	Pass
Contractor blows on the sensor to activate the alarm. Sensor responds instantly. Sumps had been recently refinished and had strong chemical smell, not fuel.															
Pump Sump	Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	2	Unk	Product	NA	Pass	NA	NA	NA	NA	NA
Tank Interstice	Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	8	10	Water	Yes	Pass	NA	NA	NA	NA	NA
Tank Interstice	Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	15	15	Water	NA	Pass	NA	NA	NA	NA	NA
Emergency generator with 1000 gallon tank.															
Tank Interstice	Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	5	3	Water	Yes	Pass	NA	NA	NA	NA	NA
Tank Interstice	Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	4	4	Water	Yes	Pass	NA	NA	NA	NA	NA
Tank Interstice	Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	3	3	Water	NA	Pass
Contractor blows on the sensor to activate the alarm.															
Tank Interstice	Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Product	NA	Pass
Contractor blows on the sensor to activate the alarm. Sensor responds instantly.															
Tank Interstice	Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Product	NA	Pass
Contractor blows on the sensor to activate the alarm. Sensor responds instantly.															
Tank Interstice	Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Product	NA	Pass
Contractor blows on the sensor to activate the alarm. Sensor responds instantly.															

All times are recorded in seconds and heights in inches.

Sensor Location	Panel Make	Panel Model	At Low Point	Wiring OK	Condition of Location	*Liquid Testing* Resp	Rec	Alarm	PSD	Result	*Flip Testing* Resp	Rec	Alarm	PSD	Result
Tank Interstice	Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	2	Unk	Product	NA	Pass	NA	NA	NA	NA	NA
Tank Interstice	Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	2	Unk	Product	NA	Pass	NA	NA	NA	NA	NA
Tank Interstice	Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Both	NA	Pass
Contractor blows on the sensor to activate the alarm.															
Tank Interstice	Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	3	3	Water	NA	Pass
Contractor blows on the sensor to activate the alarm.															
Tank Interstice	Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	3	3	None	Yes	Pass	NA	NA	NA	NA	NA
Tank Interstice	Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	3	3	Water	NA	Pass
Contractor blows on the sensor to activate the alarm.															
Tank Interstice	Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	1	Unk	Both	Yes	Pass	NA	NA	NA	NA	NA
Sensor activates an audible alarm and shuts down pump at the dispenser.															
Tank Interstice	Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	1	Unk	Both	Yes	Pass	NA	NA	NA	NA	NA
Sensor activates an audible alarm and shuts down pump at the dispenser.															
Tank Interstice	Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	None	None	None	NA	Fail
Contractor waited for 2 minutes for the sensor to response, but never did. Sensor had to be replaced.															
Tank Interstice	Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	None	NA	None	No	Fail	NA	NA	NA	NA	NA
Sensor was not tested because it was stuck in the interstitial space.															
Tank Interstice	Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	2	Unk	Product	NA	Pass	NA	NA	NA	NA	NA
Sensor Model: LAVS-1					**Operating Principle:** Metal Oxide Semiconductor										
Tank Interstice	Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	Unk	Unk	Unk	No	Fail	NA	NA	NA	NA	NA
Sensor Model: LS 03875 STP Sensor					**Operating Principle:** Thermal Conductivity										
Pump Sump	Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	2	33	Product	Yes	Pass	NA	NA	NA	NP	NA
There was no light bulb on the monitoring panel, but alarm activated.															
Pump Sump	Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	2	11	Product	Yes	Pass	NA	NA	NA	NA	NA
There was no light bulb on the monitoring panel, but alarm activated.															
Pump Sump	Universal	Leak Alert LA-08	Yes	Yes	Clean/Dry	2	15	Product	Yes	Pass	NA	NA	NA	NP	NA
There was no light bulb on the monitoring panel, but alarm activated.															
Sensor Make: Veeder-Root															
Sensor Model: 330212-001					**Operating Principle:** Float Switch										
UDC	Veeder-Root	Dispenser cut-off	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Product	Yes	Pass

Sensor Location	Panel Make	Panel Model	At Low Point	Wiring OK	Condition of Location	*Liquid Testing* Resp	Rec	Alarm	PSD	Result	*Flip Testing* Resp	Rec	Alarm	PSD	Result
UDC	Veeder-Root	Dispenser cut-off	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	MR	Both	NP	Pass
Sensor cuts power to dispenser, which must be manually reset.															
UDC	Veeder-Root	Dispenser cut-off	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	1	Product	Yes	Pass
UDC	Veeder-Root	Dispenser cut-off	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Product	Yes	Pass
UDC	Veeder-Root	Dispenser cut-off	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Product	Yes	Pass
UDC	Veeder-Root	Dispenser cut-off	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	MR	Both	NP	Pass
Sensor cuts power to dispenser, which must be manually reset.															
UDC	Veeder-Root	Dispenser cut-off	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	MR	Both	NP	Pass
Sensor cuts power to dispenser, which must be manually reset.															
Sensor Model: 331102-002				**Operating Principle:** Float Switch											
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	8	1	Both	Yes	Pass
Sensor has double float alarm (high/low). Service technician decided only to do the flip test.															
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	1	Both	Yes	Pass
Sensor has double float alarm (high/low). Service technician decided only to do the flip test.															
Sensor Model: 794380-208				**Operating Principle:** Float Switch											
ATG Sump	Veeder-Root	TLS-350	Yes	Yes	Water	NT	NT	NT	NT	NT	Unk	Unk	Product	NP	Pass
Sump contains dirty water. Alarm was set at the control panel.															
ATG Sump	Veeder-Root	TLS-350	Yes	Yes	Water	NT	NT	NT	NT	NT	Unk	Unk	Product	NP	Pass
Sump contains dirty water. Alarm was set at the control panel.															
ATG Sump	Veeder-Root	TLS-350	Yes	Yes	Water	NT	NT	NT	NT	NT	Unk	Unk	Product	NP	Pass
Sump contains dirty water. Alarm was set at the control panel															
ATG Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	1	Product	Yes	Pass
ATG Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	1	Product	Yes	Pass
ATG Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	1	Product	Yes	Pass
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Water	NT	NT	NT	NT	NT	3	3	Product	Yes	Pass
Fill sump contains water, dirt, and corrosion.															
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Debris	NT	NT	NT	NT	NT	3	2	Product	NP	Pass
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Product	NT	NT	NT	NT	NT	2	2	Product	NP	Pass
Sensor was in alarm when technician arrived to conduct inspection. Technician called to have the product removed.															
Fill Sump	Veeder-Root	TLS-350	No	Yes	Water	NT	NT	NT	NT	NT	2	2	Product	NP	Pass

Sensor Location	Panel Make	Panel Model	At Low Point	Wiring OK	Condition of Location	*Liquid Testing* Resp	Rec	Alarm	PSD	Result	*Flip Testing* Resp	Rec	Alarm	PSD	Result
Fill Sump	Veeder-Root	TLS-350	No	Yes	Product	NT	NT	NT	NT	NT	2	2	Product	NP	Pass
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Product	Yes	Pass
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Water	NT	NT	NT	NT	NT	10	2	Product	Yes	Pass
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Debris	NT	NT	NT	NT	NT	2	2	Product	NP	Pass
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	5	Unk	Product	NA	Pass	NT	NT	NT	NT	NT
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Product	NT	NT	NT	NT	NT	8	Unk	Product	NP	Pass
Fill sump contains waste oil.															
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Product	NT	NT	NT	NT	NT	8	Unk	Product	NP	Pass
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Product	NT	NT	NT	NT	NT	8	Unk	Product	NP	Pass
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Product	NT	NT	NT	NT	NT	8	Unk	Product	NP	Pass
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	10	5	Product	Yes	Pass	NT	NT	NT	NT	NT
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	5	5	Product	Yes	Pass	NT	NT	NT	NT	NT
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	8	5	Product	Yes	Pass	NT	NT	NT	NT	NT
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	5	5	Product	Yes	Pass	NT	NT	NT	NT	NT
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	5	5	Product	Yes	Pass	NT	NT	NT	NT	NT
Fill Sump	Veeder-Root	TLS-350	No	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Fill Sump	Veeder-Root	TLS-350	No	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Water	NT	NT	NT	NT	NT	none	NA	None	No	Fail
Technician waited for over 2 minutes, but sensor did not alarm. Finally inspector decided to call the test off and replace the sensor. Testing was done on the new sensor and it passed.															
Fill Sump	Veeder-Root	TLS-350	No	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	1	Product	Yes	Pass
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Water	NT	NT	NT	NT	NT	5	1	Product	Yes	Pass
Fill Sump	Veeder-Root	Unk	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	6	Product	NP	Pass
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	12	2	Product	Yes	Pass
Fill Sump	Veeder-Root	TLS-350	No	Yes	Water	NT	NT	NT	NT	NT	15	1	Product	Yes	Pass
The sensor was not located at the lowest point in the tank. Technician lowered it and activetd an alarm.															
Fill Sump	Veeder-Root	Unk	Yes	Yes	Water	NT	NT	NT	NT	NT	5	6	Product	Yes	Pass

Sensor Location	Panel Make	Panel Model	At Low Point	Wiring OK	Condition of Location	*Liquid Testing* Resp	Rec	Alarm	PSD	Result	*Flip Testing* Resp	Rec	Alarm	PSD	Result
Fill Sump	Veeder-Root	TLS-350	No	Yes	Water	NT	NT	NT	NT	NT	5	1	Product	NP	Pass
Contains a substantial amount of water.															
Fill Sump	Veeder-Root	Unk	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	6	Product	Yes	Pass
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	1	Product	Yes	Pass
The sensor was not at the lowest point in the tank.															
Fill Sump	Veeder-Root	Unk	Yes	Yes	Water	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Sump has 4-5 inches of water. Technician was waiting for maintinance to clean the water before putting back the sensor.															
Fill Sump	Veeder-Root	Unk	Yes	Yes	Water	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Sump has 4-5 inches of water. Technician was waiting for maintinance to clean the water before putting back the sensor.															
Piping Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	6	4	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	Unk	Unk	Product	NP	Pass
Alarm was set at the control panel.															
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Water	5	2	Product	Yes	Pass	NT	NT	NT	NT	NT
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Water	5	2	Product	Yes	Pass	NT	NT	NT	NT	NT
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Water	5	2	Product	Yes	Pass	NT	NT	NT	NT	NT
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Water	NT	NT	NT	NT	NT	10	10	Product	NP	Pass
Flip Test- estimated response of 10 seconds.															
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	10	Product	NP	Pass
Flip Test- estimated response of 10 seconds															
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	Unk	Unk	Product	NP	Pass
Alarm was set at the control panel.															
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	8	2	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Water	NT	NT	NT	NT	NT	6	2	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	5	5	Product	Yes	Pass	NT	NT	NT	NT	NT
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Product	NT	NT	NT	NT	NT	5	2	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	5	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
The cable is too short to test sensor in liquid, Instead perform a flip test.															
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	8	2	Product	Yes	Pass

Sensor Location	Panel Make	Panel Model	At Low Point	Wiring OK	Condition of Location	*Liquid Testing* Resp	Rec	Alarm	PSD	Result	*Flip Testing* Resp	Rec	Alarm	PSD	Result
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	10	Product	NP	Pass
Flip Test- estimated response of 10 seconds															
Pump Sump	Veeder-Root	TLS-350	No	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Water	NT	NT	NT	NT	NT	5	1	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	No	Yes	Product	NT	NT	NT	NT	NT	5	1	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	1	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	1	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	10	4	Product	Yes	Pass	NT	NT	NT	NT	NT
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	12	4	Product	Yes	Pass	NT	NT	NT	NT	NT
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	Unk	Unk	Product	NP	Pass
Alarm was set at the control panel.															
Pump Sump	Veeder-Root	TLS-350	No	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	8	4	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	10	4	Product	Yes	Pass	NT	NT	NT	NT	NT
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	6	4	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	No	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Pump Sump	Unk	Unk	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	6	6	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	5	5	Product	Yes	Pass	NT	NT	NT	NT	NT
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	Unk	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	Unk	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	8	4	Product	Yes	Pass	NT	NT	NT	NT	NT
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	15	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	7	5	Product	Yes	Pass	NT	NT	NT	NT	NT
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	10	5	Product	Yes	Pass	NT	NT	NT	NT	NT
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Cable was too short to allow for testing in liquid. Flip test was used.															
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Cable was too short to allow for testing in liquid. Flip test was used.															

Sensor Location	Panel Make	Panel Model	At Low Point	Wiring OK	Condition of Location	*Liquid Testing* Resp	Rec	Alarm	PSD	Result	*Flip Testing* Resp	Rec	Alarm	PSD	Result
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Cable was too short to allow for testing in liquid. Flip test was used.															
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	Unk	Unk	Product	Unk	Pass
Tested 4 of VR 208 sensors, all 4 alarms were set.															
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	Unk	Unk	Product	Unk	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	Unk	Unk	Product	Unk	Pass
Pump Sump	Veeder-Root	Unk	Yes	Yes	Water	NT	NT	NT	NT	NT	5	6	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	15	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	No	Yes	Product	NT	NT	NT	NT	NT	3	3	Product	NP	Pass
2-3 gallons of product in the sump. Sensor was raised above the product level. Sensor in pump sump was not programmed to shut down pump.															
Pump Sump	Veeder-Root	Unk	No	Yes	Water	25	17	Water	Yes	Pass	NT	NT	NT	NT	NT
Fill bucket was detached. Stick was in the product line (to prevent the flapper from shutting down the flow)															
Pump Sump	Veeder-Root	Unk	No	Yes	Water	20	20	Water	Yes	Pass	NT	NT	NT	NT	NT
Fill bucket was detached. Stick was in the product line (to prevent the flapper from shutting down the flow)															
Pump Sump	Veeder-Root	Unk	No	Yes	Water	20	20	Water	Yes	Pass	NT	NT	NT	NT	NT
Fill bucket was detached. Stick was in the product line (to prevent the flapper from shutting down the flow)															
Pump Sump	Veeder-Root	Unk	No	Yes	Water	20	15	Water	Yes	Pass	NT	NT	NT	NT	NT
Sensor timed out & Technician had to go and re-set it to shut down the pump.															
Pump Sump	Veeder-Root	Unk	No	Yes	Water	25	30	Water	Yes	Pass	NT	NT	NT	NT	NT
Sensor timed out & Technician had to go and re-set it to shut down the pump.															
Pump Sump	Veeder-Root	Unk	No	Yes	Water	20	30	Water	Yes	Pass	NT	NT	NT	NT	NT
Sensor timed out & Technician had to go and re-set it to shut down the pump.															
Pump Sump	Veeder-Root	Unk	No	Yes	Water	20	20	Water	Yes	Pass	NT	NT	NT	NT	NT
Sensor timed out & Technician had to go and re-set it to shut down the pump.															
Pump Sump	Veeder-Root	Unk	No	Yes	Water	20	15	Water	Yes	Pass	NT	NT	NT	NT	NT
Fill bucket was detached. Stick was in the product line (to prevent the flapper from shutting down the flow). Most of sensors timed out & Technician had to go and re-set it to shut down the pump.															
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	Unk	Unk	Product	Unk	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	3	5	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	3	3	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass

Sensor Location	Panel Make	Panel Model	At Low Point	Wiring OK	Condition of Location	Liquid Testing Resp	Rec	Alarm	PSD	Result	Flip Testing Resp	Rec	Alarm	PSD	Result
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	No	Yes	Water	NT	NT	NT	NT	NT	2	Unk	Product	Yes	Pass
2 sensors, 1 raised in sump and the other was a the lowest point. Both responded and activated pump shut off. Picture of sensor was taken.															
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Water	NT	NT	NT	NT	NT	2	Unk	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	15	5	Product	Yes	Pass	NT	NT	NT	NT	NT
Pump Sump	Veeder-Root	TLS-350	No	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Sensor was raised about 4 inches from the bottom of the sump.															
Pump Sump	Veeder-Root	TLS-350	No	Yes	Product	NT	NT	NT	NT	NT	3	3	Product	NP	Pass
2-3 gallons of product in the sump. Sensor was raised above the product level. Sensor in pump sump was not programmed to shut down pump.															
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	15	10	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	12	10	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	10	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	No	Yes	Product	NT	NT	NT	NT	NT	8	10	Product	Yes	Pass
Product is leaking out of the top of the turbine pump.															
Pump Sump	Veeder-Root	TLS-350	No	Yes	Product	NT	NT	NT	NT	NT	8	10	Product	Yes	Pass
Product is leaking out of the top of the turbine pump.															
Pump Sump	Veeder-Root	TLS-350	No	Yes	Product	NT	NT	NT	NT	NT	8	10	Product	Yes	Pass
Product is leaking out of the top of the turbine pump.															
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	6	Unk	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	6	Unk	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	15	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	3	5	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	4	4	Product	Yes	Pass
Noticed a 1" hole in the sump, which will need to be repaired in order to have tight secondary containment.															
Pump Sump	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-300	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	30	Unk	Product	NP	Pass

All times are recorded in seconds and heights in inches.

Sensor Location	Panel Make	Panel Model	At Low Point	Wiring OK	Condition of Location	*Liquid Testing* Resp	Rec	Alarm	PSD	Result	*Flip Testing* Resp	Rec	Alarm	PSD	Result
Pump Sump	Veeder-Root	TLS-350	No	Yes	Clean/Dry	NT	NT	NT	NT	NT	4	5	Product	Yes	Pass
There was a hole in the sump, approximately 1 1/2" diam. Electrical wiring below penetration lines. Hydrostatic test was performed to the highest penetration lines at 16 minutes per cycle.Test at 16 psi and fail if below 12 psi. Fill sump is not clean..															
Pump Sump	Veeder-Root	TLS-350	No	Yes	Clean/Dry	NT	NT	NT	NT	NT	er 2 m	NA	None	No	Fail
The contractor decided to stop testing the sensor after it failed to respond for more than 2 minutes and replace it with a new sensor.															
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	4	4	NA	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	3	3	Product	Yes	Pass
Pump Sump	Unk	Unk	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	4	4	Product	Yes	Pass
Pump Sump	Veeder-Root	Unk	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	8	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	1	Both	NP	Pass
Pump Sump	Veeder-Root	Unk	Yes	Yes	Water	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Sump has 4-5 inches of water. Technician was waiting for maintinance to clean the water before putting back the sensor.															
Pump Sump	Veeder-Root	Unk	Yes	Yes	Water	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Sump has 4-5 inches of water. Technician was waiting for maintinance to clean the water before putting back the sensor.															
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	15	Product	Yes	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	15	Unk	Product	Unk	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	10	5	Product	Yes	Pass	NT	NT	NT	NT	NT
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	6	4	Product	Yes	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	6	4	Product	Yes	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	15	10	Product	Yes	Pass	NT	NT	NT	NT	NT
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	15	Product	Yes	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	6	4	Product	Yes	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	15	Product	Yes	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	15	Product	Yes	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	8	2	Product	Yes	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	15	Unk	Product	Unk	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	15	Unk	Product	Unk	Pass

Sensor Location	Panel Make	Panel Model	At Low Point	Wiring OK	Condition of Location	*Liquid Testing*					*Flip Testing*				
						Resp	Rec	Alarm	PSD	Result	Resp	Rec	Alarm	PSD	Result
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	15	Unk	Product	Unk	Pass
Tested six dispensers, all passed-alarms set (total of six triggers), all six sensors (VR 208) are working.															
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	10	Product	NP	Pass
Flip Test- estimated response of 10 seconds															
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	8	2	Product	Yes	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	8	2	Product	Yes	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	8	2	Product	Yes	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	8	2	Product	Yes	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	8	2	Product	Yes	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	15	10	Product	Yes	Pass	NT	NT	NT	NT	NT
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	6	4	Product	Yes	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	10	5	Product	Yes	Pass	NT	NT	NT	NT	NT
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	10	Product	NP	Pass
Flip Test- estimated response of 10 seconds															
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	10	Product	NP	Pass
Flip Test- estimated response of 10 seconds															
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	10	Product	NP	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	10	Product	NA	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	10	Product	NP	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	6	4	Product	Yes	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	6	4	Product	Yes	Pass
UDC	Veeder-Root	Unk	Yes	Yes	Clean/Dry	20	20	Water	Yes	Pass	NT	NT	NT	NT	NT
Sensor timed out & Technician had to go and re-set it to shut down the pump. Technician conducts water and flip test in some of the sensors because the wire did not reach te water bucket.															
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	15	Unk	Product	Unk	Pass
UDC	Veeder-Root	Unk	Yes	Yes	Clean/Dry	20	25	Water	Yes	Pass	NT	NT	NT	NT	NT
Sensor timed out & Technician had to go and re-set it to shut down the pump. Technician conducts water and flip test in some of the sensors because the wire did not reach te water bucket.															
UDC	Veeder-Root	Unk	Yes	Yes	Clean/Dry	22	22	Water	Yes	Pass	NT	NT	NT	NT	NT
Sensor timed out & Technician had to go and re-set it to shut down the pump. Technician conducts water and flip test in some of the sensors because the wire did not reach the water bucket.															
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	15	Unk	Product	Unk	Pass

All times are recorded in seconds and heights in inches.

Sensor Location	Panel Make	Panel Model	At Low Point	Wiring OK	Condition of Location	*Liquid Testing* Resp	Rec	Alarm	PSD	Result	*Flip Testing* Resp	Rec	Alarm	PSD	Result
UDC	Veeder-Root	Unk	Yes	Yes	Clean/Dry	22	22	Water	Yes	Pass	NT	NT	NT	NT	NT
UDC	Veeder-Root	Unk	Yes	Yes	Clean/Dry	21	21	Water	Yes	Pass	NT	NT	NT	NT	NT
Sensor timed out & Technician had to go and re-set it to shut down the pump. Technician conducts water and flip test in some of the sensors because the wire did not reach te water bucket.															
UDC	Veeder-Root	Unk	Yes	Yes	Clean/Dry	25	22	Water	Yes	Pass	NT	NT	NT	NT	NT
Sensor timed out & Technician had to go and re-set it to shut down the pump. Technician conducts water and flip test in some of the sensors because the wire did not reach te water bucket.															
UDC	Veeder-Root	Unk	Yes	Yes	Clean/Dry	22	22	Water	Yes	Pass	NT	NT	NT	NT	NT
UDC	Veeder-Root	Unk	Yes	Yes	Clean/Dry	20	20	Unk	Unk	Unk	NT	NT	NT	NT	NT
Sensor timed out & Technician had to go and re-set it to shut down the pump. Technician conducts water and flip test in some of the sensors because the wire did not reach te water bucket.															
Unk	Veeder-Root	TLS-350	No	Yes	Water	NT	NT	NT	NT	NT	2	2	Product	No	Fail
Alarm activated at the control panel, but no pump shutdown. (printer said pump shutdown occurred, but pump continued to run. Picture of sensor is site 7 #2.). Follow up was done on this site and Inspector confirmed that the PSD is functioning properly.															
Vault	Gilbarco	Unk	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Product	NP	Pass
Single wall steel tank inside a Vault. Vapor recovery fill bucket is half way full of water.															
Sensor Model: 794380-209				**Operating Principle:** Float Switch											
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Water	NT	NT	NT	NT	NT	12	Unk	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	12	Unk	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	12	Unk	Product	Yes	Pass
Sensor Model: 794380-300				**Operating Principle:** Float Switch											
Tank Interstice	Veeder-Root	TLS-300	NA	Yes	Brine-Filled	2	2	Water	NA	Pass	NT	NT	NT	NT	NT
Sensor Model: 794380-301				**Operating Principle:** Float Switch											
Tank Interstice	Veeder-Root	Simplicity	Yes	Yes	Brine-Filled	NT	NT	NT	NT	NT	6	1	Both	Yes	Pass
Tank Interstice	Veeder-Root	Simplicity	Yes	Yes	Brine-Filled	NT	NT	NT	NT	NT	6	1	Both	Yes	Pass
Tank Interstice	Veeder-Root	Simplicity	Yes	Yes	Brine-Filled	NT	NT	NT	NT	NT	6	1	Both	Yes	Pass
Sensor Model: 794380-302				**Operating Principle:** Float Switch											
Tank Interstice	Veeder-Root	TLS-350	NA	Yes	Brine-Filled	20	15	Water	NA	Pass	NT	NT	NT	NT	NT
Technician lifted sensor out of brine reservoir to activate the "low water level" alarm.															
Tank Interstice	Veeder-Root	TLS-350	NA	Yes	Brine-Filled	10	Unk	Low Brine Level	Yes	Pass	NT	NT	NT	NT	NT
Tank Interstice	Veeder-Root	TLS-350	NA	Yes	Brine-Filled	10	Unk	Low Brine Level	Yes	Pass	NT	NT	NT	NT	NT

Sensor Location	Panel Make	Panel Model	At Low Point	Wiring OK	Condition of Location	*Liquid Testing*					*Flip Testing*				
						Resp	Rec	Alarm	PSD	Result	Resp	Rec	Alarm	PSD	Result
Tank Interstice	Veeder-Root	TLS-350	NA	Yes	Brine-Filled	20	15	Water	NA	Pass	NT	NT	NT	NT	NT
Technician lifted sensor out of brine reservoir to activate the "low water level" alarm.															
Tank Interstice	Veeder-Root	TLS-350	NA	Yes	Brine-Filled	30	10	Water	NA	Pass	NT	NT	NT	NT	NT
Technician lifted sensor out of brine reservoir to activate the "low water level" alarm.															
Tank Interstice	Veeder-Root	TLS-350	NA	Yes	Brine-Filled	5	5	Product	Yes	Pass	NT	NT	NT	NT	NT
Tank Interstice	Veeder-Root	TLS-350	NA	Yes	Brine-Filled	10	Unk	Low Brine Level	Yes	Pass	NT	NT	NT	NT	NT
Tank Interstice	Veeder-Root	TLS-350	NA	Yes	Brine-Filled	30	10	Water	NA	Pass	NT	NT	NT	NT	NT
Technician lifted sensor out of brine reservoir to activate the "low water level" alarm.															

Sensor Model: 794380-408 **Operating Principle:** Float Switch

Sensor Location	Panel Make	Panel Model	At Low Point	Wiring OK	Condition of Location	Liquid Resp	Liquid Rec	Liquid Alarm	Liquid PSD	Liquid Result	Flip Resp	Flip Rec	Flip Alarm	Flip PSD	Flip Result
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	6	Unk	Product	NP	Pass
Alarm set at the control panel, sensor is not programmed for pump shut down or dispenser shut down.															
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	6	Unk	Product	NP	Pass
Alarm set at the control panel, sensor is not programmed for pump shut down or dispenser shut down.															
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	6	Unk	Product	NP	Pass
Alarm set at the control panel, sensor is not programmed for pump shut down or dispenser shut down.															
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	6	Unk	Product	NP	Pass
Alarm set at the control panel, sensor is not programmed for pump shut down or dispenser shut down.															

Sensor Model: 794380-500 **Operating Principle:** Float Switch

Sensor Location	Panel Make	Panel Model	At Low Point	Wiring OK	Condition of Location	Liquid Resp	Liquid Rec	Liquid Alarm	Liquid PSD	Liquid Result	Flip Resp	Flip Rec	Flip Alarm	Flip PSD	Flip Result
Tank Interstice	Veeder-Root	TLS-300	NA	Yes	Brine-Filled	2	2	Water	NA	Pass	NT	NT	NT	NT	NT

Sensor Model: 794390-205 **Operating Principle:** Float Switch

Sensor Location	Panel Make	Panel Model	At Low Point	Wiring OK	Condition of Location	Liquid Resp	Liquid Rec	Liquid Alarm	Liquid PSD	Liquid Result	Flip Resp	Flip Rec	Flip Alarm	Flip PSD	Flip Result
Fill Sump	Veeder-Root	TLS-350	No	Yes	Product	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Sump had oil in it. Sensor was raised above the oil, but alarmed when technician lowered it into the oil. Contractor was notified to pump out the oil that day.															
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	5	5	Product	NA	Pass	NT	NT	NT	NT	NT
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	5	5	Product	NA	Pass	NT	NT	NT	NT	NT
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	Unk	Product	NP	Pass
Fill Sump	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	10	Product	Yes	Pass
Sensor was Gilbarco equivalent of Veeder Root Model 794380-205. Cable was too short to test the sensor in liquid, so flip test was used.															
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	6	Product	NP	Pass
Fill Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	6	Product	NP	Pass

Sensor Location	Panel Make	Panel Model	At Low Point	Wiring OK	Condition of Location	*Liquid Testing* Resp	Rec	Alarm	PSD	Result	*Flip Testing* Resp	Rec	Alarm	PSD	Result
Fill Sump	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Sensor was Gilbarco equivalent of Veeder Root Model 794380-205. Cable was too short to test the sensor in liquid, so flip test was used.															
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Water	NT	NT	NT	NT	NT	90	Unk	Product	NP	Pass
sensor is not programmed for positive shut down, only sets an audible alarm.															
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	8	6	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	6	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	10	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	5	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	25	5	Both	Yes	Pass
Some condensation on sump.															
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	90	Unk	Product	NP	Pass
sensor is not programmed for positive shut down, only sets an audible alarm.															
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	5	5	Product	Yes	Pass	NT	NT	NT	NT	NT
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	10	5	Product	Yes	Pass	NT	NT	NT	NT	NT
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	90	Unk	Product	NP	Pass
sensor is not programmed for positive shut down, only sets an audible alarm.															
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	15	5	Both	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Product	NT	NT	NT	NT	NT	5	1	Both	NP	Pass
1 inch of kerosene in sump; this sensor was tested with just an alarm first; retesting while running pump and the pump did not shut off.															
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	20	5	Both	Yes	Pass
Pump Sump	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	10	Product	Yes	Pass
Sensor was Gilbarco equivalent of Veeder Root Model 794380-205. Cable was too short to test the sensor in liquid, so flip test was used.															
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	20	10	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	15	5	Both	Yes	Pass
For this tank, there are two sumps, but only one sensor (the sumps are linked).															
Pump Sump	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Sensor was Gilbarco equivalent of Veeder Root Model 794380-205. Cable was too short to test the sensor in liquid, so flip test was used.															
Pump Sump	Veeder-Root	TLS-350	No	Yes	Clean/Dry	NT	NT	NT	NT	NT	15	10	Product	Yes	Pass
Sensor was raised approximately 1 foot from bottom of the sump.															
Pump Sump	Veeder-Root	TLS-350	Unk	Yes	Water	NT	NT	NT	NT	NT	1	2	Product	Yes	Pass

Sensor Location	Panel Make	Panel Model	At Low Point	Wiring OK	Condition of Location	Liquid Testing Resp	Liquid Testing Rec	Liquid Testing Alarm	Liquid Testing PSD	Liquid Testing Result	Flip Testing Resp	Flip Testing Rec	Flip Testing Alarm	Flip Testing PSD	Flip Testing Result
Pump Sump	Veeder-Root	TLS-350	Unk	Yes	Water	NT	NT	NT	NT	NT	5	2	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	15	10	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	10	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	1	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	1	Product	Yes	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	20	5	Both	Yes	Pass
Diesel tank interstice 50m from sump.															
Tank Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	25	Unk	Product	NP	Pass
Suction system with tank top sump.															
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	4	1	Product	Yes	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	4	1	Product	Yes	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	4	1	Product	Yes	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	4	1	Product	Yes	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	4	1	Product	Yes	Pass

Sensor Model: 794390-407 **Operating Principle:** Float Switch

Sensor Location	Panel Make	Panel Model	At Low Point	Wiring OK	Condition of Location	Liquid Testing Resp	Liquid Testing Rec	Liquid Testing Alarm	Liquid Testing PSD	Liquid Testing Result	Flip Testing Resp	Flip Testing Rec	Flip Testing Alarm	Flip Testing PSD	Flip Testing Result
Tank Interstice	Veeder-Root	TLS-350	No	No	Clean/Dry	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
The sensor was located at the top of the tank, at the access port. The pull-string was broken. Inspector said sensor must be fixed immediately. The sensor was not functionally tested during this inspection. Afollow up was done & sensor was repaired.															
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	NP	Pass
Wrap-around sensor. Techician moved sensor toward top of tank until alarm sounded. Did not completely remove the sensor.															
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	NP	Pass
Wrap-around sensor. Techician moved sensor toward top of tank until alarm sounded. Did not completely remove the sensor.															
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	NP	Pass
Wrap-around sensor. Techician moved sensor toward top of tank until alarm sounded. Did not completely remove the sensor.															
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Unk	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Water	NT	NT	NT	NT	NT	5	5	Product	NP	Fail
Sensor would not go into alarm until the techician shook it vigorously. Float was stuck. Interstice was moist, but not enough liquid to activate an alarm.															

Sensor Location	Panel Make	Panel Model	At Low Point	Wiring OK	Condition of Location	*Liquid Testing* Resp	Rec	Alarm	PSD	Result	*Flip Testing* Resp	Rec	Alarm	PSD	Result
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	10	Product	NP	Pass
Technician pulled sensor around the tank until alarm activated, but did not fully remove the sensor from the annular space.															
Tank Interstice	Veeder-Root	TLS-350	NA	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	10	Product	Yes	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	Unk	Unk	Product	NP	Pass
Alarm was set during the removal of the sensor from the tank interstice.															
Tank Interstice	Veeder-Root	TLS-350	NA	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	15	Product	Yes	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	Unk	Unk	Product	NP	Pass
Alarm was set during the removal of the sensor from the tank interstice.															
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Unk	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	10	Product	NP	Pass
Technician pulled sensor around the tank until alarm activated, but did not fully remove the sensor from the annular space.															
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	NP	Fail
Sensor would not go into alarm until the techician shook it vigorously. Float was stuck.															
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	10	Product	NP	Pass
Technician pulled sensor around the tank until alarm activated, but did not fully remove the sensor from the annular space.															
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Unk	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	10	Product	NP	Pass
Technician pulled sensor around the tank until alarm activated, but did not fully remove the sensor from the annular space.															
Sensor Model: 794390-409				**Operating Principle:** Float Switch											
Tank Interstice	Veeder-Root	TLS-350	NA	Yes	Clean/Dry	NT	NT	NT	NT	NT	3	2	Product	Yes	Pass
Tank Interstice	Veeder-Root	TLS-350	Unk	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Unk	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Water	NT	NT	NT	NT	NT	2	2	Product	Yes	Pass
Tank Interstice	Veeder-Root	TLS-350	Unk	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	9	Unk	Product	NP	Pass
Sensor is not set up for pump shut down.															
Tank Interstice	Veeder-Root	Unk	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	17	17	Product	Yes	Pass
Three tanks (1 split gasoline tank & 2 diesel tanks)															
Tank Interstice	Veeder-Root	Unk	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	20	20	Product	Yes	Pass

Sensor Location	Panel Make	Panel Model	At Low Point	Wiring OK	Condition of Location	*Liquid Testing*					*Flip Testing*				
						Resp	Rec	Alarm	PSD	Result	Resp	Rec	Alarm	PSD	Result
Tank Interstice	Veeder-Root	Unk	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	20	20	Product	Yes	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	15	Unk	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	15	Unk	Product	NP	Pass
Tested 4 of 409 sensors, all appeared to be dry and clean; alarms set for all sensors.															
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Unk	NT	NT	NT	NT	NT	10	10	Product	NP	Pass
Flip Test - Approximately 10 Seconds.															
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Unk	NT	NT	NT	NT	NT	10	10	Product	NP	Pass
Flip Test - Approximately 10 Seconds.															
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	15	Unk	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	Unk	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	15	Unk	Product	Unk	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	9	Unk	Product	NP	Pass
Sensor is not set up for pump shut down.															
Tank Interstice	Veeder-Root	TLS-350	Unk	Yes	Clean/Dry	NT	NT	NT	NT	NT	75	Unk	Product	NP	Fail
Sensor was wedged between the primary and secondary tank walls and cannot be removed to verify sensor type. Alarm was set at the control panel by pulling it. The response time was estimated because there was no way of knowing when sensor was triggered.															
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	45	Unk	Product	NP	Pass
Follow up was made on this site with the local agnecy and assured that next day, the contractor replaced the broken sensors. Inspector did not re-inspect, but received a report from the contractor indicating that the sensor is working properly.															
Tank Interstice	Veeder-Root	TLS-350	Unk	Unk	Clean/Dry	NT	NT	NT	NT	NT	None	Unk	None	NP	Fail
Sensor was wedged between the primary and secondary tank walls and cannot be removed to verify sensor type. Alarm was not set at the control panel by pulling it like the prevous two tanks.															
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	Unk	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Unk	NT	NT	NT	NT	NT	10	10	Product	NP	Pass
Flip Test - Approximately 10 Seconds.															
Sensor Model: 794390-420					**Operating Principle:** Float Switch										
Piping Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	NP	Pass
3 small steel pipes (1 for each generator) were run within one large steel pipe. The sensor monitors the large pipe, which stays dry unless the small pipes leak.															
Piping Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	NP	Pass
3 small steel pipes (1 for each generator) were run within one large steel pipe. The sensor monitors the large pipe, which stays dry unless the small pipes leak.															
Piping Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	NP	Pass
3 small steel pipes (1 for each generator) were run within one large steel pipe. The sensor monitors the large pipe, which stays dry unless the small pipes leak.															
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass

All times are recorded in seconds and heights in inches.

Sensor Location	Panel Make	Panel Model	At Low Point	Wiring OK	Condition of Location	*Liquid Testing* Resp	Rec	Alarm	PSD	Result	*Flip Testing* Resp	Rec	Alarm	PSD	Result
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	No	No	Water	NT	NT	NT	NT	NT	5	5	Product	NP	Pass
Waste oil contained oil/water around the tank sump. The sensor was not located in the lowest point.															
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	4	2	Product	Yes	Pass
The sump contained product.															
Pump Sump	Veeder-Root	TLS-320	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	4	2	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Water/Product	NT	NT	NT	NT	NT	10	5	Product	Yes	Pass
Sensor was sitting in 3-4 inches of water/product but was not in alarm. However, sensor activated alarm when flipped.															
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Tank Interstice	Veeder-Root	TLS-350	NA	NA	Clean/Dry	NT	NT	NT	NT	NT	5	3	Product	NP	Pass
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	NP	Pass
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Unk	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Unk	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	NA	NA	Clean/Dry	NT	NT	NT	NT	NT	5	3	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Contractor mentioned that this type of sensors are constantly cracking and split out in age(chronic problem). Maybe it's a design problem.Even when sensors are cracked, contractor usually don't replace them.															
Tank Interstice	Veeder-Root	Unk	No	Yes	Water	NT	NT	NT	NT	NT	4	4	Product	Yes	Pass
Interstitial space is full of water. Technician could not put back the sensor without calling the maintenance to remove water. Sensor was not at lowest point and wire was wrapped up.															
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	5	5	Product	Yes	Pass	NT	NT	NT	NT	NT
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	NP	Pass
Sensor casing was corroded and cracked. This is a chronic problem with this model. Even when cracked, contractor does not replace them because they all tend to be like that after a while.															
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	5	5	Product	Yes	Pass	NT	NT	NT	NT	NT
Tank Interstice	Veeder-Root	Unk	No	Yes	Water	NT	NT	NT	NT	NT	4	4	Product	Yes	Pass
Tank Interstice	Veeder-Root	TLS-350	NA	NA	Clean/Dry	NT	NT	NT	NT	NT	5	3	Product	NP	Pass
Tank Interstice	Veeder-Root	Unk	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	25	Unk	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	Unk	Product	NP	Pass

Sensor Location	Panel Make	Panel Model	At Low Point	Wiring OK	Condition of Location	*Liquid Testing* Resp	Rec	Alarm	PSD	Result	*Flip Testing* Resp	Rec	Alarm	PSD	Result
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Product	NP	Pass
Tank Interstice	Pneumeractor	LC-1000	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Product	NP	Pass
Tank Interstice	Pneumeractor	LC-1000	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Product	Yes	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Water	NT	NT	NT	NT	NT	5	Unk	Product	NP	Pass
Sensor was wet when removed from tank interstice. It is unknown how much liquid was in interstice.															
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	Unk	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	Unk	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	5	5	Product	Yes	Pass	NT	NT	NT	NT	NT
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	Unk	Product	NP	Pass
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	Unk	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	Unk	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	Unk	Product	Yes	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	Unk	Product	Yes	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	5	5	Product	NA	Pass	NT	NT	NT	NT	NT
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	5	5	Product	Yes	Pass	NT	NT	NT	NT	NT
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	5	5	Product	Yes	Pass	NT	NT	NT	NT	NT
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	5	5	Product	NA	Pass	NT	NT	NT	NT	NT
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	3	3	Product	NA	Pass	NT	NT	NT	NT	NT
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	10	Unk	Product	NP	Pass
.															
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	Unk	Product	Yes	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Product	Yes	Pass

Sensor Location	Panel Make	Panel Model	At Low Point	Wiring OK	Condition of Location	*Liquid Testing* Resp	Rec	Alarm	PSD	Result	*Flip Testing* Resp	Rec	Alarm	PSD	Result
Tank Interstice	Veeder-Root	TLS-300	No	Yes	Clean/Dry	NT	NT	NT	NT	NT	30	Unk	Product	NP	Pass
This sensor is for steel tanks, and could not be wrapped around the FG tank. Local agency instructed owner to replace.															
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	None	NA	Both	NP	Fail
Original sensor was stuck in the interstice because of rust on casing; sensor was replaced. New sensor passed test.															
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	5	5	Product	Yes	Pass	NT	NT	NT	NT	NT
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	5	5	Product	Yes	Pass	NT	NT	NT	NT	NT
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Both	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Both	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	Unk	Product	Yes	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	Yes	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	NP	Pass
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	NP	Pass
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	NP	Pass
Steel sensor casing was split.															
Tank Interstice	Gilbarco	EMC	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	NP	Pass
Steel sensor casing was split.															
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Product	Yes	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	3	3	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	1	1	Both	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	3	3	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	3	3	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	NA	Yes	Clean/Dry	NT	NT	NT	NT	NT	None	NA	None	NP	Fail
The sensor was missing the float. Follow up was made with local agency and confirmed that the technician repaired the sensor. However, inspector did not peform re-inspection.															
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	NP	Pass

Sensor Location	Panel Make	Panel Model	At Low Point	Wiring OK	Condition of Location	*Liquid Testing* Resp	Rec	Alarm	PSD	Result	*Flip Testing* Resp	Rec	Alarm	PSD	Result
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	NP	Pass
Sensor housing (steel bell) was split.															
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Product	Yes	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	2	2	Product	Yes	Pass
Sensor Model: 794390-460				**Operating Principle:** Float Switch											
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	NP	Pass
Tank Interstice	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	5	5	Product	NP	Pass
UDC	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	4	1	Product	Yes	Pass
Sensor Model: 847990-001				**Operating Principle:** Float Switch											
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	20	5	Both	Yes	Pass
Pump Sump	Veeder-Root	TLS-350	Yes	Yes	Clean/Dry	NT	NT	NT	NT	NT	20	5	Both	Yes	Pass
UDC	Dispenser Cut-off	Unk	Yes	Yes	Clean/Dry	1	MR	Unk	NA	Pass	NT	NT	NT	NT	NT
The sensor cuts power to dispensers. Dispenser had to be manually reset to clear alarm.															
UDC	Dispenser Cut-off	Unk	Yes	Yes	Clean/Dry	2	MR	Unk	NA	Pass	NT	NT	NT	NT	NT
The sensor cuts power to dispensers. Dispenser had to be manually reset to clear alarm.															
UDC	Dispenser Cut-off	Unk	Yes	Yes	Clean/Dry	3	MR	Unk	NA	Pass	NT	NT	NT	NT	NT
The sensor cuts power to dispensers. Dispenser had to be manually reset to clear alarm.															
UDC	Dispenser Cut-off	Unk	Yes	Yes	Clean/Dry	2	MR	Unk	NA	Pass	NT	NT	NT	NT	NT
The sensor cuts power to dispensers. Dispenser had to be manually reset to clear alarm.															
Sensor Make: Warrick Controls															
Sensor Model: DLP-1-NC				**Operating Principle:** Float Switch											
Pump Sump	Warrick	Unk	Yes	Yes	Water	NT	NT	NT	NT	NT	None	NA	None	NP	Fail
Sensor was sitting in water and not alarmed. Contractor shook sensor and float moved activating the alarm. Sensor passed retest after 1-2 second alarm response.															
Pump Sump	Warrick	Unk	Yes	Yes	Water	NT	NT	NT	NT	NT	Unk	Unk	Both	NP	Pass

APPENDIX VI, TABLE 3
Field Data for Discriminating Sensors

TABLE 3 - Field Data for Discriminating Sensors

Low Water Test					*High Water Test*					*Product Testing*					*Flip Testing*				
Resp	**Rec**	**Alarm**	**PSD**	**Result**	**Resp**	**Rec**	**Alarm**	**PSD**	**Result**	**Resp**	**Rec**	**Alarm**	**PSD**	**Result**	**Resp**	**Rec**	**Alarm**	**PSD**	**Result**
Sensor Make: Alpha wire																			
Sensor Model Unk																			
NT	NT	NT	NT	NT	NA	NA	NA	NA	NA	NT	NT	NT	NT	NT	60	60	Product	NP	Pass
NT	NT	NT	NT	NT	NA	NA	NA	NA	NA	NT	NT	NT	NT	NT	None	NA	None	NP	Fail
Sensor Make: Emco																			
Sensor Model Q0003-001																			
60	Unk	Water	NA	Pass	60	Unk	Water	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Local agency did not require discriminating sensors to be tested in product.																			
60	Unk	Water	NA	Pass	60	Unk	Water	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Local agency did not require discriminating sensors to be tested in product.																			
60	Unk	Water	NA	Pass	60	Unk	Water	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Local agency did not require discriminating sensors to be tested in product.																			
60	Unk	Water	NA	Pass	60	Unk	Water	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Local agency did not require discriminating sensors to be tested in product.																			
60	Unk	Water	NA	Pass	60	Unk	Water	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Local agency did not require discriminating sensors to be tested in product.																			
Sensor Model Q0003-002																			
60	Unk	Water	NA	Pass	60	Unk	Water	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Local agency did not require discriminating sensors to be tested in product.																			
60	60	Water	NA	Pass	60	60	Water	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Local agency did not require discriminating sensors to be tested in product.																			
60	60	Water	NA	Pass	60	60	Water	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Local agency did not require discriminating sensors to be tested in product.																			
60	Unk	Water	NA	Pass	60	Unk	Water	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Local agency did not require discriminating sensors to be tested in product.																			
60	Unk	Water	NA	Pass	60	Unk	Water	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Local agency did not require discriminating sensors to be tested in product.																			
60	Unk	Water	NA	Pass	60	Unk	Water	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Local agency did not require discriminating sensors to be tested in product.																			
Sensor Make: Incon																			
Sensor Model TSP-DIS																			
4	Unk	Both	Yes	Pass	NA	NA	NA	NA	NA	NT	NT	NT	NT	NT	NA	NA	NA	NA	NA
Sensor Make: Mallory Controls																			

All times are recorded in seconds and heights in inches.

Low Water Test					*High Water Test*					*Product Testing*					*Flip Testing*				
Resp	**Rec**	**Alarm**	**PSD**	**Result**	**Resp**	**Rec**	**Alarm**	**PSD**	**Result**	**Resp**	**Rec**	**Alarm**	**PSD**	**Result**	**Resp**	**Rec**	**Alarm**	**PSD**	**Result**
Sensor Model Pollulert FD 221GTRA																			
10	Dry	Water	NA	Pass	NA	NA	NA	NA	NA	10	Dry	Product	NA	Pass	NA	NA	NA	NA	NA
Sensor had to be wiped dry to come out of alarm.																			
10	Dry	Water	NA	Pass	NA	NA	NA	NA	NA	10	Dry	Product	NA	Pass	NA	NA	NA	NA	NA
Sensor had to be wiped dry to come out of alarm.																			
10	Dry	Water	NA	Pass	NA	NA	NA	NA	NA	10	Dry	Product	NA	Pass	NA	NA	NA	NA	NA
Sensor had to be wiped dry to come out of alarm.																			
Sensor Model Pollulert MD 241RRA																			
10	Dry	Water	NA	Pass	NA	NA	NA	NA	NA	10	Dry	Product	NA	Pass	NA	NA	NA	NA	NA
Sensor had to be wiped dry to come out of alarm.																			
10	Dry	Water	NA	Pass	NA	NA	NA	NA	NA	10	Dry	Product	NA	Pass	NA	NA	NA	NA	NA
Sensor had to be wiped dry to come out of alarm.																			
10	Dry	Water	NA	Pass	NA	NA	NA	NA	NA	10	Dry	Product	NA	Pass	NA	NA	NA	NA	NA
Sensor had to be wiped dry to come out of alarm.																			
NT	NT	NT	NT	NT	NA	NA	NA	NA	NA	10	10	Product	Yes	Pass	NA	NA	NA	NA	NA
NT	NT	NT	NT	NT	NA	NA	NA	NA	NA	NA	NA	None	No	Fail	NA	NA	NA	NA	NA
Sensor failed the test, but the company is out of business.So, owner might have to change the system. Inspector gave the owner two weeks to fix it or replace It.																			
NT	NT	NT	NT	NT	NA	NA	NA	NA	NA	20	10	Product	Yes	Pass	NA	NA	NA	NA	NA
Sensor Make: Red Jacket																			
Sensor Model RE400-203																			
1	1	Water	NA	Pass	NA	NA	NA	NA	NA	NT	NT	NT	NT	NT	NA	NA	NA	NA	NA
1	1	Water	NA	Pass	NA	NA	NA	NA	NA	NT	NT	NT	NT	NT	NA	NA	NA	NA	NA
1	1	Water	NA	Pass	NA	NA	NA	NA	NA	NT	NT	NT	NT	NT	NA	NA	NA	NA	NA
1	1	Water	NA	Pass	NA	NA	NA	NA	NA	NT	NT	NT	NT	NT	NA	NA	NA	NA	NA
1	1	Water	NA	Pass	NA	NA	NA	NA	NA	NT	NT	NT	NT	NT	NA	NA	NA	NA	NA
1	1	Water	NA	Pass	NA	NA	NA	NA	NA	NT	NT	NT	NT	NT	NA	NA	NA	NA	NA
Sensor Make: Veeder-Root																			
Sensor Model 794380-320																			
Unk	Unk	Unk	Unk	Unk	2	5	Water	Unk	Pass	383	1030	Product	Unk	Pass	NA	NA	NA	NA	NA
Unk	Unk	Unk	Unk	Unk	1	7	Water	Unk	Pass	395	962	Product	Unk	Pass	NA	NA	NA	NA	NA
Sensor Model 794380-322																			
5	Unk	Water	NA	Pass	5	5	Water	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Technician flipped the sensor, activating both low and high water alarms at the same time.																			

Low Water Test					*High Water Test*					*Product Testing*					*Flip Testing*				
Resp	**Rec**	**Alarm**	**PSD**	**Result**	**Resp**	**Rec**	**Alarm**	**PSD**	**Result**	**Resp**	**Rec**	**Alarm**	**PSD**	**Result**	**Resp**	**Rec**	**Alarm**	**PSD**	**Result**
Sensor Model			794380-341																
NT	NT	NT	NT	NT	5	1	Water	Yes	Pass	5	1	Product	Yes	Pass	NA	NA	NA	NA	NA
When placed in fuel, alarms went off as water - pump shut-down worked; waste oil sensor failed, replaced and recorded on separate sheet.																			
10	10	Water	Yes	Pass	NA	NA	NA	NA	NA	10	10	Water	Yes	Fail	NA	NA	NA	NA	NA
Technician had to clean the sensor with a rag completely (especially in the small window at sensor's center) before fuel could be detected. After cleaning sensor did detect fuel.																			
10	10	Water	Yes	Pass	NA	NA	NA	NA	NA	10	10	Water	Yes	Fail	NA	NA	NA	NA	NA
Technician had to clean the sensor with a rag completely (especially in the small window at sensor's center) before fuel could be detected. After cleaning sensor did detect fuel.																			
10	10	Water	Yes	Pass	NA	NA	NA	NA	NA	10	10	Water	Yes	Fail	NA	NA	NA	NA	NA
Technician had to clean the sensor with a rag completely (especially in the small window at sensor's center) before fuel could be detected. After cleaning sensor did detect fuel.																			
Unk	Unk	Unk	Unk	Unk	NA	NA	NA	NA	NA	NA	NA	None	Unk	Fail	NA	NA	NA	NA	NA
Unk	Unk	Unk	Unk	Unk	NA	NA	NA	NA	NA	2	2	Product	Unk	Pass	NA	NA	NA	NA	NA
Unk	Unk	Unk	Unk	Unk	NA	NA	NA	NA	NA	2570	4240	Product	Unk	Pass	NA	NA	NA	NA	NA
Unk	Unk	Unk	Unk	Unk	NA	NA	NA	NA	NA	5	5	Product	Unk	Pass	NA	NA	NA	NA	NA
3	3	Water	Yes	Pass	NA	NA	NA	NA	NA	3	3	Product	Yes	Pass	NA	NA	NA	NA	NA
12	1	Water	NA	Pass	NA	0	NA	NA	NA	13	Unk	Water	No	Fail	NA	NA	NA	NA	NA
Sensor sets water alarm for product test. After testing the sensor was replaced and the new sensor was setting the right alarm.																			
NT	NT	NT	NT	NT	5	1	Water	Yes	Pass	5	1	Product	Yes	Pass	NA	NA	NA	NA	NA
NT	NT	NT	NT	NT	5	1	Water	Yes	Pass	5	1	Product	Yes	Pass	NA	NA	NA	NA	NA
NT	NT	NT	NT	NT	NA	NA	NA	NA	NA	Unk	Unk	None	No	Fail	NA	NA	NA	NA	NA
Replaced with same type of sensor.																			
3	2	Both	Yes	Pass	NA	NA	NA	NA	NA	3	2	Both	Yes	Pass	NA	NA	NA	NA	NA
Sensor had been programmed to give the same alarm in water and product.																			
3	2	Both	Yes	Pass	NA	NA	NA	NA	NA	3	2	Both	Yes	Pass	NA	NA	NA	NA	NA
Sensor had been programmed to give the same alarm in water and product.																			
3	2	Both	Yes	Pass	NA	NA	NA	NA	NA	3	2	Both	Yes	Pass	NA	NA	NA	NA	NA
Sensor had been programmed to give the same alarm in water and product.																			
3	3	Water	Yes	Pass	NA	NA	NA	NA	NA	3	3	Water	Yes	Fail	NA	NA	NA	NA	NA
Detected product as water. Since pump shuts down for product or water, Local Agency did not require sensor to be changed. Owner will replace sensor or re-program as non-discriminating.																			
12	1	Water	NA	Pass	NA	0	NA	NA	NA	13	Unk	Product	Yes	Pass	NA	NA	NA	NA	NA
Unk	Unk	Unk	Unk	Unk	NA	NA	NA	NA	NA	2	2	Product	Unk	Pass	NA	NA	NA	NA	NA
12	1	Water	NA	Pass	NA	0	NA	NA	NA	12	Unk	Water	No	Fail	NA	NA	NA	NA	NA
Sensor sets water alarm for product test. After testing, sensor was replaced and the new sensor was setting the right alarm.																			
NT	NT	NT	NT	NT	NA	0	NA	NA	NA	13	Unk	Water	NA	Fail	NA	NA	NA	NA	NA
Sensor was tested with both unleaded gasoline and waste oil. Both cases, water alarms were observed. Sensor was not approved for use in waste oil. After testing, sensor was replaced and it passed the product test.																			
Unk	Unk	Unk	Unk	Unk	NA	NA	NA	NA	NA	NA	NA	None	Unk	Fail	NA	NA	NA	NA	NA
Unk	Unk	Unk	Unk	Unk	3	10	Water	Unk	Pass	358	2450	Product	Unk	Pass	NA	NA	NA	NA	NA

All times are recorded in seconds and heights in inches.

Low Water Test					*High Water Test*					*Product Testing*					*Flip Testing*				
Resp	**Rec**	**Alarm**	**PSD**	**Result**	**Resp**	**Rec**	**Alarm**	**PSD**	**Result**	**Resp**	**Rec**	**Alarm**	**PSD**	**Result**	**Resp**	**Rec**	**Alarm**	**PSD**	**Result**
Unk	Unk	Unk	Unk	Unk	NA	NA	NA	NA	NA	4	10	Product	Unk	Pass	NA	NA	NA	NA	NA
Unk	Unk	Unk	Unk	Unk	NA	NA	NA	NA	NA	417	1055	Product	Unk	Pass	NA	NA	NA	NA	NA
3	3	Water	Yes	Pass	NA	NA	NA	NA	NA	3	3	Water	Yes	Fail	NA	NA	NA	NA	NA
Detected product as water. Since pump shuts down for product or water, Local Agency did not require sensor to be changed. Owner will replace sensor or reprogram as non-discriminating.																			
Sensor Model		794380-350																	
5	5	Water	NA	Pass	5	5	Water	Yes	Pass	360	465	Product	Yes	Pass	NA	NA	NA	NA	NA
Technician left sensor in product for 2min & 45sec. He rinsed the sensor with soapy water after alarm activated to speed up recovery time.																			
1	1	Water	NA	Pass	5	5	Water	Yes	Pass	360	765	Product	Yes	Pass	NA	NA	NA	NA	NA
Technician left sensor in product for 2min & 45sec. He rinsed the sensor with soapy water after alarm activated to speed up recovery time.																			
2	2	Water	NA	Pass	2	2	Water	Yes	Pass	300	480	Product	Yes	Pass	NA	NA	NA	NA	NA
2	2	Water	NA	Pass	2	Unk	Water	Yes	Pass	480	Non	Product	Yes	Fail	NA	NA	NA	NA	NA
Sensor did not come out of alarm after being tested in product, so technician replaced it.																			
2	2	Water	NA	Pass	None	Non	None	No	Fail	none	Unk	None	No	Fail	NA	NA	NA	NA	NA
Sensor did not respond during high water or product testing. Technician suspected wiring problem, since sensor was replaced but test results did not change.																			
2	2	Water	NA	Pass	2	2	Water	Yes	Pass	180	NA	Product	Yes	Pass	NA	NA	NA	NA	NA
2	2	Water	NA	Pass	2	2	Water	No	Fail	Unk	Unk	Product	No	Fail	NA	NA	NA	NA	NA
Technician suspected a problem with the wiring at this site.																			
5	5	Water	NA	Pass	5	5	Water	NA	Pass	480	300	Product	Yes	Pass	NA	NA	NA	NA	NA
Technician left sensor in product for 2min & 45sec. He rinsed the sensor with soapy water after alarm activated to speed up recovery time.																			
1	1	Water	NA	Pass	5	5	Water	Yes	Pass	330	600	Product	Yes	Pass	NA	NA	NA	NA	NA
Technician left sensor in product for 2min & 45sec. He rinsed the sensor with soapy water after alarm activated to speed up recovery time.																			
5	Unk	Water	NA	Pass	2	2	Water	Yes	Pass	300	600	Product	Yes	Pass	NA	NA	NA	NA	NA
Sensors were left in fuel for 3 minutes. They alarm 2-5 minutes after being pulled from fuel. This speeds up recovery time.																			
5	5	Water	NA	Pass	5	5	Water	Yes	Pass	300	360	Product	Yes	Pass	NA	NA	NA	NA	NA
Technician left sensor in product for 2min & 45sec. He rinsed the sensor with soapy water after alarm activated to speed up recovery time.																			
5	5	Water	NA	Pass	5	5	Water	Yes	Pass	330	420	Product	Yes	Pass	NA	NA	NA	NA	NA
Technician left sensor in product for 2min & 45sec. He rinsed the sensor with soapy water after alarm activated to speed up recovery time.																			
5	5	Water	NA	Pass	5	5	Water	NA	Pass	300	540	Product	Yes	Pass	NA	NA	NA	NA	NA
Technician left sensor in product for 2min & 45sec. He rinsed the sensor with soapy water after alarm activated to speed up recovery time.																			
5	5	Water	NA	Pass	5	5	Water	NA	Pass	720	360	Product	Yes	Pass	NA	NA	NA	NA	NA
Technician left sensor in product for 2min & 45sec. He rinsed the sensor with soapy water after alarm activated to speed up recovery time.																			
5	5	Water	NA	Pass	5	5	Water	NA	Pass	360	1500	Product	Yes	Pass	NA	NA	NA	NA	NA
Technician left sensor in product for 2min & 45sec. He rinsed the sensor with soapy water after alarm activated to speed up recovery time.																			
5	Unk	Water	NA	Pass	2	2	Water	Yes	Pass	420	720	Product	Yes	Pass	NA	NA	NA	NA	NA
Sensors were left in fuel for 3 minutes. They alarm 2-5 minutes after being pulled from fuel. This speeds up recovery time.																			
1	1	Water	NA	Pass	5	5	Water	Yes	Pass	300	540	Product	Yes	Pass	NA	NA	NA	NA	NA
Technician left sensor in product for 2min & 45sec. He rinsed the sensor with soapy water after alarm activated to speed up recovery time.																			

Low Water Test					*High Water Test*					*Product Testing*					*Flip Testing*				
Resp	**Rec**	**Alarm**	**PSD**	**Result**	**Resp**	**Rec**	**Alarm**	**PSD**	**Result**	**Resp**	**Rec**	**Alarm**	**PSD**	**Result**	**Resp**	**Rec**	**Alarm**	**PSD**	**Result**
7	1	Water	NA	Pass	3	1	Water	Yes	Pass	360	720	Product	Yes	Pass	NA	NA	NA	NA	NA
For product test, sensor was left in fuel for 3 minutes.																			
NT	NT	NT	NT	NT	5	1	Water	Yes	Pass	360	900	Product	Yes	Pass	NA	NA	NA	NA	NA
NT	NT	NT	NT	NT	5	1	Water	Yes	Pass	360	900	Product	Yes	Pass	NA	NA	NA	NA	NA
NT	NT	NT	NT	NT	5	1	Water	Yes	Pass	360	900	Product	Yes	Pass	NA	NA	NA	NA	NA
NT	NT	NT	NT	NT	5	1	Water	Yes	Pass	840	Unk	Product	Yes	Pass	NA	NA	NA	NA	NA
Takes longer for this sensor to alarm because often left sitting in water.																			
7	1	Water	NA	Pass	5	1	Water	Yes	Pass	300	300	Product	Yes	Pass	NA	NA	NA	NA	NA
For product test, sensor was left in fuel for 3 minutes.																			
7	1	Water	NA	Pass	4	1	Water	Yes	Pass	360	590	Product	Yes	Pass	NA	NA	NA	NA	NA
For product test, sensor was left in fuel for 3 minutes.																			
7	1	Water	NA	Pass	5	1	Water	Yes	Pass	360	660	Product	Yes	Pass	NA	NA	NA	NA	NA
For product test, sensor was left in fuel for 3 minutes.																			
Unk	Unk	Unk	Unk	Unk	4	5	Water	Unk	Pass	238	3531	Product	Unk	Pass	NA	NA	NA	NA	NA
7	1	Water	NA	Pass	6	1	Water	Yes	Pass	360	1020	Product	Yes	Pass	NA	NA	NA	NA	NA
For product test, sensor was left in fuel for 3 minutes.																			
5	Unk	Water	NA	Pass	2	2	Water	Yes	Pass	300	600	Product	Yes	Pass	NA	NA	NA	NA	NA
Sensors were left in fuel for 3 minutes. They alarm 2-5 minutes after being pulled from fuel. This speeds up recovery time.																			
Unk	Unk	Unk	Unk	Unk	2	10	Water	Unk	Pass	365	1100	Product	Unk	Pass	NA	NA	NA	NA	NA
Unk	Unk	Unk	Unk	Unk	4	7	Water	Unk	Pass	357	890	Product	Unk	Pass	NA	NA	NA	NA	NA
2	2	Water	NA	Pass	2	2	Water	No	Fail	Unk	Unk	Product	No	Fail	NA	NA	NA	NA	NA
Sensor alarmed, but failed PSD. Problem with the relay is suspected.																			
Unk	Unk	Unk	Unk	Unk	3	9	Water	Unk	Pass	206	1390	Product	Unk	Pass	NA	NA	NA	NA	NA
5	Unk	Water	NA	Pass	2	2	Water	Yes	Pass	300	600	Product	Yes	Pass	NA	NA	NA	NA	NA
Sensors were left in fuel for 3 minutes. They alarm 2-5 minutes after being pulled from fuel. This speeds up recovery time.																			
5	5	Water	NA	Pass	5	5	Water	NA	Pass	420	420	Product	Yes	Pass	NA	NA	NA	NA	NA
Technician left sensor in product for 2min & 45sec. He rinsed the sensor with soapy water after alarm activated to speed up recovery time.																			
Unk	Unk	Unk	Unk	Unk	5	10	Water	Unk	Pass	318	1189	Product	Unk	Pass	NA	NA	NA	NA	NA
5	Unk	Water	NA	Pass	2	2	Water	Yes	Pass	420	720	Product	Yes	Pass	NA	NA	NA	NA	NA
Sensors were left in fuel for 3 minutes. They alarm 2-5 minutes after being pulled from fuel. This speeds up recovery time.																			
7	1	Water	NA	Pass	6	1	Water	Yes	Pass	300	483	Product	Yes	Pass	NA	NA	NA	NA	NA
For product test, sensor was left in fuel for 3 minutes.																			
Unk	Unk	Unk	Unk	Unk	4	9	Water	Unk	Pass	3009	6120	Product	Unk	Pass	NA	NA	NA	NA	NA
5	Unk	Water	NA	Pass	2	2	Water	Yes	Pass	300	600	Product	Yes	Pass	NA	NA	NA	NA	NA
Sensors were left in fuel for 3 minutes. They alarm 2-5 minutes after being pulled from fuel. This speeds up recovery time.																			
Sensor Model		794380-352																	
3	1	Both	Yes	Pass	3	1	Both	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT

All times are recorded in seconds and heights in inches.

Low Water Test					High Water Test					Product Testing					Flip Testing				
Resp	**Rec**	**Alarm**	**PSD**	**Result**	**Resp**	**Rec**	**Alarm**	**PSD**	**Result**	**Resp**	**Rec**	**Alarm**	**PSD**	**Result**	**Resp**	**Rec**	**Alarm**	**PSD**	**Result**
6	1	Both	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Sensors were tested as a non-discriminating float sensor.																			
6	1	Both	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Sensors were tested as a non-discriminating float sensor.																			
NT	NT	NT	NT	NT	5	1	Both	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
These sensors were located in the fill sump, in the overfill bucket.																			
NT	NT	NT	NT	NT	1	1	Both	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
These sensors were located in the fill sump, in the overfill bucket.																			
NT	NT	NT	NT	NT	5	1	Both	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
These sensors were located in the fill sump, in the overfill bucket.																			
3	1	Both	Yes	Pass	3	1	Both	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
10	5	Water	NA	Pass	10	5	Water	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Flip test activated both low and high liquid alarms. Technician did not test the sensor in product.																			
10	5	Water	NA	Pass	10	5	Water	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Flip test activated both low and high liquid alarms. Technician did not test the sensor in product.																			
10	5	Water	NA	Pass	10	5	Water	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Flip test activated both low and high liquid alarms. Technician did not test the sensor in product.																			
15	5	Water	NA	Pass	15	5	Water	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Flip test activated both low and high liquid alarms. Technician did not test the sensor in product. Water in sump was not high enough to activate the alarm.																			
5	Unk	Water	NA	Pass	5	Unk	Water	Unk	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Local agency did not test discriminating sensors in product. Both low and high level alarms were activated by flipping the sensor.																			
5	Unk	Water	NA	Pass	5	Unk	Water	Unk	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Local agency did not test discriminating sensors in product. Both low and high level alarms were activated by flipping the sensor.																			
Unk	Unk	None	No	Fail	3	1	Both	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Sensor's low float did not activate (would not reset). Sensor was replaced by the owner without informing the local agnecy nor the contractor who does the routine inspection. Apparently, they did not retest sensor's functinality.																			
Unk	Unk	Unk	Unk	Unk	10	17	Water	Unk	Pass	425	2435	Product	Unk	Pass	NT	NT	NT	NT	NT
Cleaned in Coleman Fuel.																			
Unk	Unk	Unk	Unk	Unk	8	16	Water	Unk	Pass	446	1548	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	12	18	Water	Unk	Pass	468	960	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	4	10	Water	Unk	Pass	452	960	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	6	11	Water	Unk	Pass	NA	NA	Water	Unk	Fail	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	NT	NT	NT	NT	NT	543	570	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	10	18	Water	Unk	Pass	275	2595	Product	Unk	Pass	NT	NT	NT	NT	NT
Cleaned in Coleman Fuel.																			
6	1	Both	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Sensors were tested as a non-discriminating float sensor.																			
Unk	Unk	Unk	Unk	Unk	7	13	Water	Unk	Pass	425	1413	Product	Unk	Pass	NT	NT	NT	NT	NT

All times are recorded in seconds and heights in inches.

Low Water Test					*High Water Test*					*Product Testing*					*Flip Testing*				
Resp	**Rec**	**Alarm**	**PSD**	**Result**	**Resp**	**Rec**	**Alarm**	**PSD**	**Result**	**Resp**	**Rec**	**Alarm**	**PSD**	**Result**	**Resp**	**Rec**	**Alarm**	**PSD**	**Result**
Unk	Unk	Unk	Unk	Unk	6	16	Water	Unk	Pass	435	2040	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	9	22	Water	Unk	Pass	530	2040	Product	Unk	Pass	NT	NT	NT	NT	NT
Cleaned in Coleman Fuel.																			
Unk	Unk	Unk	Unk	Unk	4	14	Water	Unk	Pass	355	1640	Product	Unk	Pass	NT	NT	NT	NT	NT
Cleaned in Coleman Fuel.																			
Unk	Unk	Unk	Unk	Unk	5	13	Water	Unk	Pass	414	1240	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	5	12	Water	Unk	Pass	379	1143	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	6	16	Water	Unk	Pass	429	1166	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	8	21	Water	Unk	Pass	422	1320	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	5	12	Water	Unk	Pass	425	1271	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	4	9	Water	Unk	Pass	483	1229	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	7	13	Water	Unk	Pass	299	573	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	4	13	Water	Unk	Pass	318	481	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	4	11	Water	Unk	Pass	397	690	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	6	10	Water	Unk	Pass	489	1190	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	5	11	Water	Unk	Pass	539	1631	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	4	9	Water	Unk	Pass	474	1299	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	9	15	Water	Unk	Pass	495	1256	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	6	14	Water	Unk	Pass	Unk	813	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	6	16	Water	Unk	Pass	335	2010	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	2	12	Water	Unk	Pass	470	1078	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	4	11	Water	Unk	Pass	350	3499	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	5	10	Water	Unk	Pass	459	1769	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	6	14	Water	Unk	Pass	462	2206	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	5	11	Water	Unk	Pass	453	930	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	6	13	Water	Unk	Pass	440	1140	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	8	19	Water	Unk	Pass	420	1851	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	5	13	Water	Unk	Pass	540	1760	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	9	11	Water	Unk	Pass	360	1500	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	8	21	Water	Unk	Pass	354	1807	Product	Unk	Pass	NT	NT	NT	NT	NT
NT	NT	NT	NT	NT	5	5	Water	Yes	Pass	NT	NT	NT	NT	NT	5	5	Water	Yes	Pass
Sensor was programmed for PSD on high-liquid only, not product. Technician re-programmed for PSD on low, high, and product.																			

Low Water Test					*High Water Test*					*Product Testing*					*Flip Testing*				
Resp	**Rec**	**Alarm**	**PSD**	**Result**	**Resp**	**Rec**	**Alarm**	**PSD**	**Result**	**Resp**	**Rec**	**Alarm**	**PSD**	**Result**	**Resp**	**Rec**	**Alarm**	**PSD**	**Result**
NT	NT	NT	NT	NT	5	5	Water	Yes	Pass	NT	NT	NT	NT	NT	3	5	Water	Yes	Pass
Sensor was programmed for PSD on high-liquid only, not product. Technician re-programmed for PSD on low, high, and product.																			
NT	NT	NT	NT	NT	5	5	Water	Yes	Pass	NT	NT	NT	NT	NT	3	5	Water	Yes	Pass
Sensor was programmed for PSD on high-liquid only, not product. Technician re-programmed for PSD on low, high, and product.																			
NT	NT	NT	NT	NT	5	5	Water	Yes	Pass	NT	NT	NT	NT	NT	5	5	Water	Yes	Pass
Sensor was programmed for PSD on high-liquid only, not product. Technician re-programmed for PSD on low, high, and product.																			
NT	NT	NT	NT	NT	5	5	Water	Yes	Pass	NT	NT	NT	NT	NT	5	Unk	Water	NP	Pass
10	2	Water	NA	Pass	2	2	Water	Yes	Pass	260	Unk	Product	Yes	Pass	NT	NT	NT	NT	NT
Programmed for "high vapor mode".																			
NT	NT	NT	NT	NT	5	5	Water	Yes	Pass	NT	NT	NT	NT	NT	5	Unk	Water	NP	Pass
3	3	Water	NA	Pass	2	2	Water	Yes	Pass	240	Unk	Product	Yes	Pass	NT	NT	NT	NT	NT
Programmed for "high vapor mode". Sensor intermittently activated "sensor out" alarm when being moved. Technician suspected a short in wiring where cable attaches to sensor.																			
Unk	Unk	Unk	Unk	Unk	5	14	Water	Unk	Pass	730	1276	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	13	21	Water	Unk	Pass	480	600	Product	Unk	Pass	NT	NT	NT	NT	NT
NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Wiring malfunctioning.																			
NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Wiring malfunctioning.																			
NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
NT	NT	NT	NT	NT	60	5	Water	Yes	Pass	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
NT	NT	NT	NT	NT	NA	NA	NA	NA	NA	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Had 2 bad relays that had to be fixed.																			
NT	NT	NT	NT	NT	10	5	Water	Yes	Pass	NT	NT	NT	NT	NT	5	Unk	Water	NP	Pass
Unk	Unk	Unk	Unk	Unk	10	24	Water	Unk	Pass	520	1769	Product	Unk	Pass	NT	NT	NT	NT	NT
NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Had 2 bad relays that had to be fixed.																			
Unk	Unk	Unk	Unk	Unk	13	24	Water	Unk	Pass	420	1978	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	18	25	Water	Unk	Pass	385	1470	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	12	25	Water	Unk	Pass	412	1920	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	12	25	Water	Unk	Pass	400	1695	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	15	28	Water	Unk	Pass	335	2281	Product	Unk	Pass	NT	NT	NT	NT	NT
NT	NT	NT	NT	NT	5	5	Water	Yes	Pass	NT	NT	NT	NT	NT	5	5	Water	Yes	Pass
Sensor was programmed for PSD on high-liquid only, not product. Technician re-programmed for PSD on low, high, and product.																			
Unk	Unk	Unk	Unk	Unk	16	30	Water	Unk	Pass	Unk	Unk	Product	Unk	Pass	NT	NT	NT	NT	NT
Emergency shut-off activated during testing, so no data was available.																			
Unk	Unk	Unk	Unk	Unk	8	19	Water	Unk	Pass	420	1625	Product	Unk	Pass	NT	NT	NT	NT	NT

All times are recorded in seconds and heights in inches.

Low Water Test					*High Water Test*					*Product Testing*					*Flip Testing*				
Resp	**Rec**	**Alarm**	**PSD**	**Result**	**Resp**	**Rec**	**Alarm**	**PSD**	**Result**	**Resp**	**Rec**	**Alarm**	**PSD**	**Result**	**Resp**	**Rec**	**Alarm**	**PSD**	**Result**
Unk	Unk	Unk	Unk	Unk	9	19	Water	Unk	Pass	NA	NA	None	Unk	Fail	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	6	15	Water	Unk	Pass	600	2120	Product	Unk	Pass	NT	NT	NT	NT	NT
Unk	Unk	Unk	Unk	Unk	10	18	Water	Unk	Pass	600	2120	Product	Unk	Pass	NT	NT	NT	NT	NT
15	Unk	Water	NA	Pass	5	Unk	Water	Yes	Pass	300	Unk	Product	Yes	Pass	NT	NT	NT	NT	NT
15	Unk	Water	NA	Pass	6	Unk	Water	Yes	Pass	390	Unk	Product	Yes	Pass	NT	NT	NT	NT	NT
15	2	Water	NA	Pass	15	3	Water	Yes	Pass	270	Unk	Product	Yes	Pass	NT	NT	NT	NT	NT
2	2	Product	Yes	Pass	2	2	Product	Yes	Pass	3	Unk	Product	Yes	Pass	NT	NT	NT	NT	NT
Programmed for "high vapor mode". Sensor was saturated with product vapors, so any liquid moving low or high float registrered as a product alarm.																			
Unk	Unk	Unk	Unk	Unk	16	41	Water	Unk	Pass	450	1559	Product	Unk	Pass	NT	NT	NT	NT	NT

APPENDIX VII
Discussion of Point Liquid and Polymer Strip Discriminating Sensors

Point Liquid and Polymer Strip Discriminating Sensors

Point liquid type sensors use solid state electronics, which measure a particular physical property or properties of liquid that contacts the detection element. An example is capacitance change sensors, where liquid contacting the detection element acts as the dielectric in a capacitor. Air (no liquid present at sensor), hydrocarbon-based liquids, and water each have distinctly different dielectric constants. A capacitance change sensor can detect this and respond differently when dry, or when exposed to water or hydrocarbons. Different responses from the sensor are interpreted by the control panel, which activates the appropriate alarm.

Point liquid discriminating sensors are capable of responding only to liquids directly in contact with the detection element. This means that product floating on water will produce a water alarm if only the water is in contact with the detection element. The detection elements are usually quite small, meaning that it does not take a great deal of water to potentially mask a product release. Point liquid discriminating sensors tend to be smaller than the polymer strip type, and contain no moving parts. These attributes allow them to be installed in a variety of orientations, and in tight spaces (such as a tank interstice) where polymer strip sensors would not fit. Response time for this type of sensor varies by manufacturer and model, but is generally quick (less than 1 minute).

In contrast to point liquid discriminating sensors, polymer strip sensors use two detection elements combined in one housing to discriminate between product and water[*]. The first detection element is a float switch or ultrasonic detector that will activate a "low liquid level" alarm when in contact with any liquid. It is located near the bottom of the sensor, and generally has a quick response time (less than 1 minute). The second detection element is a hydrocarbon-sensing cable or strip that will activate a "product" alarm when exposed to hydrocarbon-based product. It will not respond to water. The cable or strip typically runs from the bottom to the top of the sensor, and response times vary between approximately 5 minutes and 20 minutes in unleaded fuel (may be 12 hours or more in diesel fuel).

It is only by combining the float or ultrasonic liquid-sensing element with the hydrocarbon-sensing element (cable or strip) that the polymer strip type sensor is able to discriminate between product and water. A liquid entering the area monitored by the sensor will first contact the lowest float or ultrasonic detection element, activating a "low liquid level" alarm. This alarm alerts the UST operator that liquid is present in the monitored area. If the liquid present is gasoline, the hydrocarbon-sensing element will activate a "product" alarm approximately 5 to 20 minutes later (may be 12 hours or more for diesel fuel). In this event, the UST operator knows that product is present in the area monitored by the sensor, not just water.

Polymer strip discriminating sensors offer the benefit of being able to detect a layer of hydrocarbon floating on water, as long as the water level is in contact with the hydrocarbon-sensing strip. This makes them well suited for locations where water ingress is common. Many (but not all) of these sensors have an additional float or ultrasonic liquid-sensing element located at the top end of the hydrocarbon-sensing strip. This element activates a "high liquid level" alarm, which indicates that the liquid level has exceeded the height of the hydrocarbon-sensing strip. Once water has reached this level, subsequent product releases may float above and fail to contact the hydrocarbon-sensing strip, resulting in a missed detection. Polymer strip type sensors are less likely to miss a layer of product on water than point liquid discriminating sensors, but it is still a possibility that UST operators and inspectors should be aware of.

[*] Examples of polymer strip discriminating sensors include Emco Electronics models Q0003-002 and -003, Incon models TSP-DDS and TSP-DTS, and Veeder-Root models 794380-320, -322, -350, and –352).